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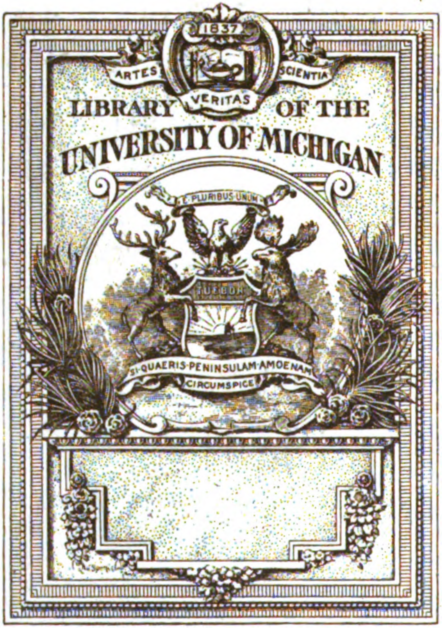
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REGISTER

OF THE

UNIVERSITY OF ARIZONA

TWELFTH YEAR
1902-1903

**Announcements
1903-1904**

TUCSON, ARIZONA
MDCCCCIII

REGISTER

OF THE

UNIVERSITY OF ARIZONA

TWELFTH YEAR

1902-1903

ANNOUNCEMENTS

1903-1904

PHOENIX, ARIZONA:
PRESS OF THE ARIZONA REPUBLICAN
1903

CALENDAR

1903

Sept. 14, Monday **Sept. 15, Tuesday**	**Entrance Examinations.**
Sept. 16, Wednesday	**Registration Day.**
Sept. 17, Thursday	**First Semester begins.**
Nov. 25, Wednesday	**Thanksgiving Recess begins.**
Nov. 30, Monday	**Instruction resumed.**
Dec. 18, Friday	**Holiday Recess begins.**

1904

Jan. 5, Tuesday	**Instruction resumed.**
Feb. 4, Thursday	**First Semester ends.**
Feb. 5, Friday	**Arbor Day; celebrated also as the Anniversary of the University.**
Feb. 8, Monday	**Second Semester begins.**
May 29, Sunday	**Baccalaureate Discourse.**
May 30, Monday	**Exhibition Military Dept.**
June 1, Wednesday	**Exhibition Mechanic Arts Department.**
June 2, Thursday	**Commencement.**

BOARD OF REGENTS

EX-OFFICIO

The Governor of the Territory..........................**Phoenix**

The Superintendent of Public Instruction................**Phoenix**

APPOINTED BY THE GOVERNOR

HON. FERRIS S. FITCH, A. B..........................**Tucson**

Chancellor.

HON. GEORGE J. ROSKRUGE..........................**Tucson**

Secretary.

HON. JOHN M. ORMSBY..................................**Tucson**

Treasurer.

HON. WINFIELD SCOTT, A. B., D. D................**Scottsdale**

(Chaplain, U. S. Army, retired.)

287931

FACULTY

FRANK YALE ADAMS, A. M.,
President;
Professor of History and Pedagogy.

WILLIAM PHIPPS BLAKE, Ph. B., A. M.,
Professor of Geology, Metallurgy and Mining; Director School of Mines.

HOWARD JUDSON HALL, A. M.,
Professor of English; Librarian.

ROBERT HUMPHREY FORBES, M. S.,
Director and Chemist Agricultural Experiment Station.

SHERMAN MELVILLE WOODWARD, M. S., A. M.,
Professor of Mathematics and Mechanics; Meteorologist, Agricultural Experiment Station.

FRANK NELSON GUILD, B. S.,
Professor of Chemistry and Mineralogy.

ALFRED JAMES McCLATCHIE, A. M.,
Professor of Agriculture and Horticulture, Agricultural Experiment Station. (Residence, Phoenix.)

DAVID HULL HOLMES, B. S.,
Professor of Mechanic Arts and Drawing; Secretary of the Faculty.

WILLIAM W. SKINNER, M. S.,
Associate Chemist Agricultural Experiment Station; Instructor in Photography.

GEORGE EDSON PHILIP SMITH, B. S., C. E.,
Professor of Physics and Engineering.

JOHN JAMES THORNBER, A. M.,
Professor of Biology; Botanist, Agricultural Experiment Station.

THOMAS FRANKLIN McCONNELL,
Professor of Animal Husbandry, Agricultural Experiment Station. (Residence, Phoenix.)

JOHN MERCER PATTON, A. M.,
(Major N. G. A.)
Assistant Professor of Modern Languages; Acting Professor of Military Science and Tactics.

MABEL GRAY HOOVER,
Instructor in Domestic Science.

HATTIE FERRIN, B. S.,
Instructor in English and Latin.

ELBERT JOHN HOLLINGSHEAD,
Instructor in Bookkeeping and Civics.

MARION CUMMINGS STANLEY, A. B.,
Instructor in Latin and English.

GEORGE MARK EVANS, LL. B.,
Registrar; Instructor in Mathematics.

JOHN WILLIAM GORBY, A. B.,
Instructor in Public Speaking.

ALICE OLIVIA BUTTERFIELD, A. B.,
Instructor in Physical Culture and History; Assistant Librarian.

BENJAMIN FRANKLIN STACEY, A. B., B. D.,
Instructor in Science.

WILBUR OLIVER HAYES,
Instructor in Stenography and Typewriting.

OTHER OFFICERS

HERBERT BROWN,
Curator Territorial Museum.

JAMES STEPHEN MANN, B. S.,
Commercial Assayer.

MRS. CORDELIA M. STEWART,
Matron in Charge of North Hall.

SEDGWICK P. GREENLEAF,
Superintendent of Buildings and Grounds.

CHAS. E. CHASE,
Engineer.

STUDENT ASSISTANTS

LESLIE A. GILLETT,
ERNEST JONES,
ROY G. MEAD,
WILLIAM D. WHIPPLE,
WM. B. ALEXANDER,
THOMAS E. STEELE,
FRANK C. KELTON,
MINNIE J. MEAD.

UNIVERSITY OF ARIZONA

ORIGIN

The University was established by an act of the Thirteenth Legislative Assembly of the Territory in 1885. The bill was introduced into the Council by Hon. C. C. Stephens of Tucson, carried through the House by the able efforts of Hon. Selim M. Franklin, and approved by the Governor March 12, 1885. A tract of forty acres of land was given by the citizens of Tucson as a site. The University was opened to students October, 1891.

DESIGN

The purpose of the University of Arizona is, in the language of the organic law, "to provide the inhabitants of this Territory with the means of acquiring a thorough knowledge of the various branches of literature, science and the arts;" and so far as possible a technical education adapted to the development of the peculiar resources of Arizona. In furtherance of this latter purpose, instruction is especially provided in agriculture, the mechanic arts, and in mining and metallurgy. The Agricultural Experiment Station, a department of the University, is wholly engaged in developing the agricultural resources of the Territory. The institution aims to fill in the Territory the place occupied in the States by the State universities. That the institution may be of service to all, a sub-collegiate department is maintained.

ORGANIZATION AND ADMINISTRATION

The government of the University is vested in a corporation styled The Board of Regents of the University of Arizona, consisting of the Governor of the Territory and the Superintendent of Public Instruction, ex-officio, and four other members appointed by the Governor.

LOCATION AND CLIMATE

The University of Arizona is located at Tucson, one of the largest towns in the Territory.

Tucson is on the main line of the Southern Pacific railway, 312 miles west of El Paso, Texas, and 500 miles east of Los Angeles, Cal. The town lies in a broad, flat valley at an elevation of 2,400 feet above sea level and is surrounded by mountains. Its dry, healthful situation with its mild and equable climate has made Tucson a famous winter resort.

The winter climate is especially good; the temperature is cool and strengthening but not severe, the lowest temperature recorded during the average year being about twenty degrees above zero, Fahrenheit. But little rain falls during the winter; fogs are unknown; cloudy days are rare, the percentage of sunshine throughout the winter being greater than that recorded at any other place in the United States. Owing to the extreme dryness of the air the highest temperatures known are less oppressive to the senses and less dangerous to the health than the summer heat of the upper Mississippi valley States. The total amount of rainfall averages less than twelve inches.

SITE

The University is situated upon high ground about a mile from the business center of the city with which it is connected by a street-car line. On every side it commands a view of mountain scenery of remarkable extent and grandeur. The location cannot be surpassed for healthfulness. The water supply of the University is drawn from a well on the premises 100 feet deep and is of unusually good quality.

BUILDINGS

The main building, University Hall, is 200x105 feet, two stories in height, the first story of gray stone, the second of red brick, and is completely surrounded by a wide two-story veranda. The building contains the offices, recitation rooms, laboratories and apparatus rooms of the various departments, an assembly room, the libraries of the University and experiment Station, and the Territorial Museum. Adjoining the main building is the mining annex, 80x60 feet, equipped with metallurgical machinery.

North Hall, a dormitory two stories in height built of gray stone of fine quality, originally provided as a home for male students, is for the use of young women. It contains sixteen rooms, each large enough to accommodate two students, a reception room and a room used for women students in physical culture.

South Hall, a fine brick dormitory containing forty rooms, with bath and toilet rooms, is for the use of male students and instructors.

A new Dining Hall with kitchen, 40x104 feet in size, provides ample accommodations for all dormitory students.

A Library and Museum building to cost $25,000, exclusive of furnishing, provided by the Twenty-first Legislative Assembly, will be erected during the current year.

A gymnasium to cost $6,575, exclusive of apparatus, given the University by Professor James Douglas and his associates, of the Copper Queen Consolidated Mining Company, is now building.

Three brick houses two stories in height are occupied as homes by the president and instructors.

A substantial brick building contains a suite of rooms for the use of the commercial assaying department, the rooms being furnished with a large melting furnace, with necessary muffle furnaces and other accessories.

Joined in continuous structure with the assaying building are the shops of the mechanic arts department, occupying an area 80x95 feet, containing a room for mechanical and free-hand drawing, and the machinery and appliances for the working of wood and iron.

Other buildings are the boiler-house, which also contains the well and pumps whereby the water supply for irrigation and general purposes is obtained; a green-house, 80x21 feet; a propagating-house; the cottage occupied by the classes in domestic science; and a temporary wooden building used for various purposes.

EQUIPMENT

LIBRARY

The library, containing 7,000 bound volumes and 11,000 pamphlets, is open to the use of all students. The books are new and standard. A valuable feature of the library is the collection of complete sets of scientific and literary periodicals, which are of special service in research work.

A complete dictionary card catalogue is maintained.

The reading-room is furnished with about seventy scientific, literary and general periodicals, besides the weekly territorial newspapers.

The Carnegie Library of the city of Tucson is also open to the use of the students of the University.

MUSEUM

The Seventeenth Legislative Assembly of Arizona passed an act establishing a general museum at the University. The object of the museum is to collect materials of all kinds illustrating the resources and development of Arizona, and particularly to preserve historical relics, including those pertaining to the aboriginal inhabitants.

Donations of specimens and collections will be received and acknowledged with thanks, but no special provision has yet been made by the Legislature for the support of this department aside from a small appropriation for the salary of a curator.

The collections now displayed at the University comprise representative series of minerals, ores and rocks of Arizona. Among these may be particularly mentioned superb specimens from the mines of the Copper Queen at Bisbee. There are also collections of typical rocks and minerals for comparison, and many specimens of ores from different parts of the United States and from abroad. Great numbers of valuable specimens are now stored in trays preparatory to classification and distribution in cases. It is desired to make the collection of ores and minerals fully represent the great mineral resources of Arizona.

The museum is indebted to Mr. Herbert Brown, curator, for a large and valuable collection of skins of the birds of Arizona, which he has deposited in the museum, as well as for a collection of ancient aboriginal pottery and other relics. The fossil skull and teeth of an elephant and other fragmentary remains of extinct animals sent from Yuma by Mr. Brown also deserve special mention.

Historical records of much value are gradually accumulating as a part of this museum, and an appeal is made to old settlers and others to bear this fact in mind when making disposition of articles bearing even remote relation to the early pioneers and their history. All records and data of any nature that can be gleaned are worthy of preservation, and we earnestly desire to have them placed at the University, where they will always be accessible for reference.

The professors at the University have the immediate care of the collections pertaining to their respective departments.

BIOLOGY

The biological laboratories are located in that portion of University Hall formerly occupied by the museum. The laboratories are convenient and well-lighted and the equipment is such as is required for modern instruction and research in the biological sciences. The library and apparatus are well selected and adapted to the region and the courses offered.

The collections possessed by this department form a very important part of its equipment. The herbarium consists of 12,000 sheets of mounted plants of which number 2,500 are included in the University botanical survey herbarium. The unique flora and fauna of the mountain, mesa and lowland collecting grounds in close proximity to the institution offer very attractive opportunities for instruction and research, especially along ecological lines.

In addition to the above there are fifty cases of insects, a large case of seeds, articulate and disarticulate human skeletons, plaster and papier-mache models of the important structures of the human anatomy, and duplicate material for study and dissection.

CHEMISTRY

The chemical laboratories are two in number. That used for beginners in the study of general chemistry and qualitative analysis is on the second floor of the main building and is equipped for the experimental and theoretical study of chemical science.

The laboratory for quantitative analysis is on the first floor of the main building. It is provided with analytical and bullion balances of the latest model and is equipped for the teaching of volumetric and gasometric analysis, blow-pipe analysis, metallurgical chemistry, and wet and fire assaying, including apparatus for the electrolytic determination of metals.

The chemical apparatus and collections are adequate and the equipment is good. Both laboratories though fairly adequate for their work are overcrowded and the time is hoped for when the institution will be possessed of a science building suitably constructed for these purposes.

The laboratory of the Experiment Station occupies three rooms on the first floor, being devoted to analytical work and chemical investigations relating to agriculture. Though not intended for the use of students it is of incidental value to the institution through the investigations which are here conducted.

MINERALOGY

The laboratory for quantitative analysis is used for determinative mineralogy and blow-pipe analysis. The laboratory is supplied with necessary apparatus for student work including glass and wood models for the study of crystallography, hand and reflecting goniometers for the measurement of the angles of crystals, and a polariscope for the study of the optical properties of minerals and a type set of 600 minerals.

PHYSICS

Three rooms on the first floor are set apart for the teaching of physics. The facilities for experimental demonstration of all important phenomena are very complete. The lecture room is fitted with shutters so that it can be darkened. A beam of sunlight directed by a fine clock heliostat outside may be thrown steadily across the lecture table for experiments on light, or used in connection with the solar lantern for a variety of other work. Adjacent to the lecture room are the laboratory and the apparatus room. Both lecture room and laboratory are supplied with water and gas.

ENGINEERING

In a partly developed territory like Arizona the engineer is called upon for the solution of a great variety of problems in the various lines of civil, hydraulic, mechanical and mining engineering, and in many difficult situations he must depend upon his knowledge and inventive ingenuity to supplement a meager equipment. To prepare the engineering student for such experiences the apparatus in this department has been chosen with a view to giving him the greatest familiarity with the theory, construction and use of those instruments and machines which observation has shown to be of universal adoption in practical engineering work. Already liberal, it is constantly being enlarged. It embraces surveyors' and engineers' chains; standard field and pocket tapes; plain and solar compasses and transits; mining transits; engineers' levels; stadia, level and transit rods; aneroid barometers; odometer; automatic water-registers; hook-gauges; three forms of current-meter; stop-watch; meteorological instruments; drafting instruments; mechanical calculators; blue-print apparatus; a four and one-fourth inch astronomical telescope with equatorial mountings and accessories; celestial sphere; a seventy-five light Mather dynamo; a Westinghouse high speed engine; pumps, steam-gauge indicator and calorimeter.

AGRICULTURE AND HORTICULTURE

Because of the situation of the territorial University the educational work in agricultural and horticulture has taken peculiar form, being largely conducted on the correspondence plan, particularly through the "Timely Hints for Farmers" issued under the auspices of the Experiment Station, but of distinct educational value. Three thousand farmers of the Territory are reached regularly twice a month by timely publications on subjects of vital interest. The Twenty-second Legislature having made provision for a conductor of Farmers' Institutes, announcement will be made soon in regard to this work, which will probably take the form of short courses in agriculture.

Small and well selected agricultural libraries of slight cost have been forwarded to a considerable number who have expressed a willingness to receive them.

It is believed that this method of dealing with our situation will become increasingly useful.

The equipment for agricultural instruction is good, consisting of an excellent seed collection, a green-house and gardens for experimental purposes containing many rare and interesting plants, and a well-selected agricultural library.

MINING AND METALLURGY

Attached to the main building is an annex or mill containing machinery and appliances for crushing, sampling, concentrating, amalgamating, leaching, chloriding, cyaniding, and for electrical treatment of various kinds of ore in large or small lots. Power is furnished by a thirty-five horse-power engine.

The mill building has a storage capacity for ore of fifty to one hundred tons. A seven-inch by ten-inch Blake crusher is used for coarse crushing and a Dodge crusher for finer work. Beneath the Blake crusher is a set of fourteen-inch by twenty-inch Cornish rolls from which the ore passes by a conveyor to the main elevator which carries it up thirty-one feet to the top of the mill. By means of slides and chutes the crushed ore may be sent at will to various machines to be tested by different methods. For concentration there are provided revolving sizing screens giving facilities for preparing six sizes, besides hydraulic separators for classifying slimes into three grades. The coarser sizes may be worked upon full-sized jigging machines of the Hartz pattern, the finer sizes being jigged upon bottom discharge machines, and the slime worked upon a double Rittinger percussion table, or otherwise as desired. Amalgamation tests may be made upon a working scale by different methods, including plates and riffles, and pans and settlers. A five-stamp gold mill with silver plates and aprons of the latest and most approved construction by Fraser & Chalmers of Chicago permits the working of free-milling gold ores by the usual methods and on a large scale. Several lots of ore have been successfully worked and returns made in gold bullion. In addition to the five-stamp mill, a smaller prospecting mill of three stamps has been added so as to work small lots of ore of from 100 to 500 pounds. It is purposed to rebuild the mill during the coming year and to add to its equipment.

The assay laboratory is equipped with assay furnaces for crucible work, for scorifying and cupeling, and for retorting mercury from amalgam, besides all needed appliances for assaying by dry and wet methods including electrolysis. The laboratory also has desks and fittings for the chemical work required in the metallurgical and mineralogical investigation and analysis of ores, and mineral fertilizers and in qualitative tests of minerals.

MECHANIC ARTS

The mechanic arts building, provided largely through the generosity of the Copper Queen Consolidated Mining Company, has a total floor area of 7,900 square feet, divided as follows: Power room and draughting room, each 1,200 square feet; wood-working shop, forge shop and machine shop, each 1,400 square feet; wash room, 600; model room, 400, and store room 300 square feet.

Each shop provides working space for twenty-four students at benches or forges and ample space for machines and tool rooms. The draughting room accommodates thirty-six students.

The power room contains two engines, a dynamo, a blower and an exhauster.

The wood-working shop is equipped with a full assortment of hand tools, four wood-turning lathes, a universal wood-worker, a dimension sawing machine and other modern wood-working appliances.

The forge room contains twenty-four down draught forges, twenty-four anvils, a blacksmith drill-press and all necessary small tools.

The machine shop contains three 14-inch engine lathes, one 24-inch engine lathe, one 16-inch shaper, one 24-inch planer, one 24-inch drill, one universal milling machine, one grinding machine, several smaller machines, vises and a complete outfit of small tools.

The entire building is well lighted and ventilated and the draughting room is heated by steam.

MILITARY

Room O is used as an armory. It is fitted with the necessary gun racks and accessories. The equipment includes 150 old style Springfield rifles, 100 Springfield cadet rifles with complete accoutrements, eight swords and belts, one 3-inch muzzle-loading rifle with carriage and complete equipment, also necessary musical instruments and signal flags.

GENERAL INFORMATION

The departments and courses of study of the University are arranged as follows:

I. COLLEGE OF AGRICULTURE AND MECHANIC ARTS.

A literary course leading to the degree of Bachelor of Philosophy.

A scientific course leading to the degree of Bachelor of Science.

An engineering course leading to the degree of Bachelor of Science in Engineering.

An agricultural course leading to the degree of Bachelor of Science in Agriculture.

A chemistry course leading to the degree of Bachelor of Science in Chemistry.

II. SCHOOL OF MINES.

A mining engineering course leading to the degree of Bachelor of Science in Mining.

A two years' course in mineralogy and assaying.

A bureau of mines and assaying.

III. AGRICULTURAL EXPERIMENT STATION.

IV. SUB-COLLEGIATE DEPARTMENT.

English, classical and scientific courses.

Manual training and domestic science courses.

Commercial course.

COLLEGE OF AGRICULTURE AND MECHANIC ARTS: SCHOOL OF MINES

FACULTY

FRANK YALE ADAMS, A. M.,
President;
Professor of History and Pedagogy.

WILLIAM PHIPPS BLAKE, Ph. B., A. M.,
Professor of Geology, Metallurgy and Mining; Director School of Mines.

HOWARD JUDSON HALL, A. M.,
Professor of English.

SHERMAN MELVILLE WOODWARD, M. S., A. M.,
Professor of Mathematics and Mechanics.

FRANK NELSON GUILD, B. S.,
Professor of Chemistry and Mineralogy.

DAVID HULL HOLMES, B. S.,
Professor of Mechanic Arts and Drawing.

GEORGE EDSON PHILIP SMITH, B. S., C. E.,
Professor of Physics and Engineering.

JOHN JAMES THORNBER, A. M.,
Professor of Biology.

JOHN MERCER PATTON, A. M.,
Assistant Professor of Modern Languages; Acting Professor of Military Science and Tactics.

WILLIAM W. SKINNER, M. S.,
Instructor in Photography.

JOHN WILLIAM GORBY, A. B.,
Instructor in Public Speaking.

MARION CUMMINGS STANLEY, A. B.,
Instructor in Latin.

ALICE OLIVIA BUTTERFIELD, A. B.,
Instructor in History.

COLLEGE OF AGRICULTURE AND MECHANIC ARTS

The courses offered in the College of Agriculture and the Mechanic Arts provide a liberal training for young men and women along literary and scientific lines, and for young men along engineering, mechanical and agricultural lines. Great latitude of election is given in the literary and scientific courses, but the course in engineering is more rigid in its requirements. Full details of the various courses follow. In all the courses the aim is to combine the practical with the theoretical in instruction. The needs of our young and growing commonwealth are kept in mind, and in all courses some instruction is provided which has for its aim the making of good citizens.

ARIZONA SCHOOL OF MINES

The School of Mines is designed for the education and training of young men in the arts and sciences directly involved in the industries of mining and metallurgy. Especial attention is given to the sciences of mathematics, physics, chemistry, mineralogy, geology, and their applications. The two years' course in Assaying is designed to prepare students as Assayers only. The Bureau of Mines and Assaying, while not directly connected with the work of instruction, affords, with its laboratory and the influx of new material, a valuable object lesson to the advanced students of mining and metallurgy.

REGISTERING

All students are required to register on registration day at the beginning of the year in the president's office. A matriculation fee of $5.00 is required of all students upon entering the University. No student will be registered until the matriculation fee has been paid. After this fee is once paid no further fee is required for registration. After registration no change in classes can be made without the consent of the committee on registration.

RECORDS

The class standing of each student is determined by the instructor in charge. The method of ascertaining the student's record is left to the instructor, and his report in all cases is final.

Reports of standing in classes are sent each month from the president's office to parents or guardians. Those to whom these reports are addressed are urgently requested to examine each with care and to spur up delinquent students or commend those who are diligent, as the case may be. Without such hearty co-operation good results cannot be expected.

DISCIPLINE

It is earnestly desired that students may be influenced to good conduct by higher motives than fear of punishment. The sense of duty and honor, the courtesy characteristic of ladies and gentlemen are appealed to as the best regulators of conduct. It is the policy of the University to allow as much liberty as will not be abused; but good order will be strictly maintained, and misconduct punished by adequate penalties. Frequenting saloons or billiard rooms, or any conduct harmful to the normal standing of the school will render the student liable to punishment, and in aggravated cases to expulsion. Any attempt on the part of a student to present as his own the work of another, or to pass any test or examination by unfair means is considered a most serious offense. In case of expulsion a student is required by law to surrender to the University his cadet uniform.

Students or classes desiring to make requests of the faculty should file their petition in the president's office before the hour of faculty meeting; class petitions must be presented at least two days before the time of meeting.

VACATIONS AND HOLIDAYS

A short recess (see calendar, page 2) is taken at Christmas time. The long summer vacation begins about June first and continues until the middle of September. The Thanksgiving recess extends from the close of the regular exercises on the Wednesday before Thanksgiving to the next Monday morning.

All legal holidays are observed by the cessation of ordinary University work.

Appropriate exercises, in which the students will be expected to join if required, may be arranged by the faculty for any legal holiday.

Arbor day has been formally adopted by the University regents as the regular anniversary on which shall be celebrated the founding of the institution, in connection with the ceremonies of tree planting.

LIVING ACCOMMODATIONS

Provision is made as far as possible for furnishing board and rooms to students of both sexes upon the University grounds.

Young men have excellent quarters in South Hall, a new dormitory building.

North Hall, the home of the young ladies, is in charge of an experienced and capable preceptress who has constant supervision of those rooming there.

Both dormitories are lighted by electricity. Rooms contain a clothes-press, and are provided with single bedsteads, table, chairs, mirror, wash-bowl, pitcher and slop-jar. Students will supply their own brooms, mattresses, pillows, sheets, blankets, towels, napkins, rugs and such other articles as they may desire for ornamenting their rooms. They will care for their own rooms under the direction of the instructor in charge.

FEES AND EXPENSES

	LOWEST	HIGHEST
Tuition, free		
Matriculation (paid but once)	$ 5.00	$ 5.00
Laboratory and shop fees, varying according to courses, per annum	1.00	30.00
Books, per annum	5.00	20.00
Board, per month	16.00	20.00
Lights per room, per month	.50	1.50

By resolution of the Board of Regents of the University, board is to be paid in advance on the first day of each month. Checks, postoffice or express money orders should be made payable to the president. No reduction will be made for absence for a period of less than one week.

Students leaving the University before the end of the semester will receive no rebate from fees.

Text-books required are obtained directly from the publishers through a book association managed on the co-operative plan under the direction of the faculty.

Members of the battalion will be required to provide themselves with the prescribed uniform, which may be obtained at the University. The cost of uniform, which must be deposited in advance, during the present year has been $16.25. This uniform has shown better wearing qualities than a civilian suit of equal cost, and parents are urged to consider the matter of uniform when supplying their sons with clothing for the approaching school year. It may be worn on all occasions, and thus will remove the necessity for additional expenditure for outer clothing other than overcoats.

Provision has been made to a limited extent for the self-support of students.

RAILROAD RATES

The Southern Pacific, the Maricopa, Phoenix & Salt River Valley, the Santa Fe, Prescott & Phoenix, and the Gila Valley, Globe & Northern railways have all generously allowed students in attendance upon the University half rates when journeying to and from their homes. This applies only to those parts of these railroads in Arizona. In the case of students coming to the University, these half rates may be secured by notifying the president of the University at least two weeks in advance, to enable him to secure the permits from the proper authorities. Tickets may then be obtained by the student on application to his own local railroad ticket agent. Students at the University may secure transportation to their homes and return at vacation time by making application at the office of the president of the University. In case of any misunderstanding with the ticket agent, the student should pay full fare, take the agent's receipt and report the matter to the University authorities.

REQUIREMENTS FOR ADMISSION

Applicants for admission to any department of the University will be required to furnish satisfactory evidence of good moral character, and of honorable dismissal from the schools with which they were last connected.

Beginning with September, 1904, for admission to the Freshman class, applicants must be at least sixteen years of age and must pass satisfactory examinations in subjects sufficient to give fifteen credits as described below. Until 1904 twelve credits will be accepted. One study pursued satisfactorily for one year, one period a day, as ordinarily taught in high schools, entitles a student to one credit.

For admission to the course leading to the degree of Bachelor of Philosophy the subjects upon which examinations must be passed, and the credits assigned each, are:

English	**3**	**Latin**	**3**
Mathematics	**3**	**Greek, French, German or Spanish**	**2**
History and Civics	**1**	**Science**	**1**
Elective	**2**		

For admission to the course leading to the degree of Bachelor of Science, including the degrees of Bachelor of Science in Mining, Engineering, Chemistry or Agriculture, the subjects upon which examinations must be passed, and the credits assigned each, are:

English	**3**	**French, German or Spanish**	**2**
Mathematics	**3**	**Science**	**3**
General History and Civics	**1**	**Elective**	**3**

The scope of work required in these various subjects is as follows:

ENGLISH—(a) English classics. An acquaintance with the works named below. These works are divided into two classes, those intended for thorough study and those intended for general reading. The portion of the examination devoted to the former class will be upon subject matter, form and structure. In addition, the candidate may be required to answer questions involving the essentials of English grammar, and the leading facts in those periods of English literary history to which the prescribed books belong. In the portion of the examination de-

voted to the latter class, the candidate will be required to present evidence of a general knowledge of the subject matter, and to answer simple questions on the lives of the authors. The form of examination will usually be the writing of a paragraph or two on each of several topics, to be chosen by the candidate from a considerable number—perhaps ten or fifteen—set before him in the examination paper. The treatment of these topics is designed to test the candidate's power of clear and accurate expression, and will call for only a general knowledge of the substance of the books. In preparation for this part of the requirement, it is important that the candidate shall have been instructed in the principles of writing English. A knowledge of grammar is presupposed. (b) English composition. This requirement can be met only by examination of the candidate or by his presenting satisfactory composition books on themes certified by a former teacher as original uncorrected work. The examination will take the form of a theme of five hundred words on some subject familiar to the candidate and will be a practical test of his ability to express himself in writing clearly and consecutively. No candidate will be accepted whose work is notably defective in point of neatness, spelling, punctuation, idiom, or division into paragraphs. Those found lacking in composition will be required to make good the deficiency at once in a special class organized for that purpose.

No student will be admitted without examination, except on the statement from his former instructors that the entire requirement has been fulfilled. Substantial equivalents, properly certified, will be accepted.

For thorough study: For 1902, 1903, 1904, 1905, Shakespeare's Macbeth; Milton's L'Allegro, Il Penserose, Comus, Lycidas; Burke's Speech on Conciliation with America; Macaulay's Essays on Milton and Addison.

For general reading: For 1903, 1904, 1905, Shakespeare's Merchant of Venice and Julius Cæsar; the Sir Roger de Coverley Papers in "The Spectator;" Goldsmith's Vicar of Wakefield; Coleridge's Rime of the Ancient Mariner; Scott's Ivanhoe; Carlyle's Essay on Burns; Tennyson's The Princess; Lowell's Vision of Sir Launfal; George Eliot's Silas Marner.

MATHEMATICS—Arithmetic as covered in White's Advanced Arithmetic to the appendix, but these subjects will b omitted in the entrance examinations: longitude and time, present worth, stock investments, exchange, equation of payments, compound proportion, partnership and cube root. Algebra, through quadratic equations, as given in Wells's Essentials of Algebra, or Wentworth's New School Algebra. Plane geometry as treated in the latest editions of Wentworth or Wells.

HISTORY AND CIVICS—American History, including the study of the subject topically. Smith's Topical Manual is used in the sub-collegiate department. As much as is included in Adams's European History and Fisk's Civil Government in the United States or text books covering equivalent ground. In place of General History the following will be accepted: History of Greece and Rome as contained in Myer's histories of Greece and Rome or an equivalent and Coman and Kendall's or Larned's History of England.

*GREEK—As covered by Gleason and Atherton's Beginners' Greek Book, Xenophon's Anabasis, four books, Homer's Iliad, three books, with composition and the use of Hadley and Allen's or Goodwin's Greek Grammar.

*LATIN—As covered by Collar's First Latin Book and Viri Romae, together with Allen and Greenough's Grammar and texts; sight reading; Cæsar, four books or an equivalent; Cicero, four orations; Vergil, six books; sight reading from Nepos, Cicero and Gellius; Daniell's or Bennett's Prose Composition.

*FRENCH—As covered by Whitney's French Grammar, parts I and II; composition; Super's French Reader; Halévy, L'Abbé Constantin; Mérimée, Colomba; Molière, Le Médecin malgré lui and Le Bourgeois Gentilhomme, and at least 300 pages from five different authors.

*SPANISH—De Tornos, Combined Spanish Grammar; Worman's First and Second Spanish Readers, Loiseaux, Elementary Spanish Reader; Valdis, Jose; Maratin, El si de los Niños; Alarcón, El Capitán Veno; Galdós, Doña Perfecta; Cervantes, Don Quixote.

*GERMAN—As covered by Kellner's German Grammar; composition; Guerber's Maerchen und Erzaehlungen, together with Riehl, Der Fluch der Schönheit; Schiller, Marie Stuart and

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*If any language is offered it must be to the extent of two credits, since a single year's study of a language is not considered of sufficient educational value to be entitled to credit.

Jungfrau von Orleans; Goethe, Hermann und Dorothea, Iphigenia; Lessing, Minna von Barnhelm.

SCIENCE—Under this head may be offered the required number of credits in the following subjects: physical geography, physiology, botany, chemistry, physics, elementary astronomy. At least half the preparation in science should consist of laboratory work. Note-book, covering such laboratory work as has been performed by the student, should be presented for examination.

ELECTIVE—The remaining credits required may be made up from additional subjects ordinarily taught in high schools.

Students from other institutions of equivalent rank may be admitted to the higher classes upon the presentation of properly authenticated certificates showing to the satisfaction of the faculty that they are qualified to proceed with the desired work.

Arrangements have been made with the Arizona Normal School at Tempe, and the Northern Normal School at Flagstaff, whereby students from these institutions may have their record transferred to the books of the University with proper credit, upon presentation of a certificate duly signed by the principal. Students of this University may also obtain the equivalent privilege at the Normal Schools by presenting the proper certificate of standing, signed by the president.

The faculty desires to establish such relations with high schools and other educational institutions as will enable it to accept their certificates without question. To this end presiding officers are respectfully requested to correspond with the president.

COURSES OF STUDY AND DEGREES

All facilities and privileges of the University are open to qualified persons of both sexes.

The University offers four-year courses of study leading to the degrees of Bachelor of Philosophy and Bachelor of Science, and to these degrees specialized as shown on page 29. In each course the work is partly required and partly elective, as described by schedules later. Each student doing full work is required to take four hours of recitation work each day. In laboratory work a period of from two to two and one-half hours is considered the equivalent of one recitation hour.

Persons of mature age and with sufficient preparation who are not candidates for a degree will in some cases be admitted to regular classes as special students, provided, however, that in all such cases they show to the satisfaction of the instructors in charge that they can take the course with profit to themselves and without detriment to the regular class.

The faculty reserves the right to omit classes in any course of instruction unless a suitable number of students register for the course.

Students who have completed satisfactorily the required work, and the specified amount of elective work as shown in the accompanying schedules will be given the degree of Bachelor of Philosophy or Bachelor of Science. The special character of any course of study may be indicated by adding to the degree the name of the department, as: Bachelor of Science in Mining, or Bachelor of Science in Chemistry.

Each candidate for graduation is required to present an acceptable thesis embodying the results of a special study of some subject within the range of the course pursued. The subject of the thesis must be submitted for the approval of the faculty not later than the opening of the second semester of the Senior year, and the completed thesis must be presented not later than three weeks before commencement day.

The advanced degrees of Master of Science and Master of Arts will be conferred upon Bachelors, graduates from this

University or from institutions of equivalent grade, who have successfully pursued at the University a course of study marked out by the faculty and requiring not less than one year.

COURSES OF INSTRUCTION

The following schedule shows the courses in which instruction is offered. The courses themselves are explained later.

Military science and tactics or physical culture is required during the Freshman and Sophomore years. If for any reason a student is excused from these exercises, an additional subject having a minimum of three recitation hours per week will be required.

Ordinary numbers within parentheses indicate hours of recitation per week; when no number is given five hours per week is understood.

Italic numbers within parentheses indicate the number of units of credit toward a degree given by any course. For explanation of the unit system, see next page.

Numbers outside parentheses are the numbers of the courses as outlined on page 30 and following.

FRESHMAN YEAR

Units.	
(4)	Mil. Sci. and Tactics (4)
(4)	Physical Culture (4)
(8)	English 1, 2
(8)	Mathematics 1, 2
(8)	Latin 1, 2
(8)	French 1, 2
(3)	Public Speaking 1, 2 (2)

Units.	
(8)	German 1, 2
(8)	Spanish 1, 2
(8)	History 1, 2 (4)
(8)	Botany 1, 2
(8)	Mechanic Arts 1, 2
(8)	Chemistry 1, 2
(4)	Artistic Drawing 1, 2 (2)

SOPHOMORE YEAR

(4)	Mil. Sci. and Tactics (4)
(4)	Physical Culture (4)
(8)	English 3, 4 (3)
(8)	Mathematics 3, 4
(8)	French 3, 4 (4)
(8)	Latin 3, 4 (4)
(8)	German 3, 4 (4)
(8)	Spanish 3, 4 (4)
(8)	Botany 3, 4

(8)	Chemistry 3, 4
(8)	Chemistry 9, 10
(4)	Mineralogy 3
(4)	History 3, 4 (2)
(8)	Engineering 1, 2
(4)	Physics 1, 2 (2)
(4)	Mechanic Arts 3, 4 (2)
(4)	Mechanic Arts 5, 6 (2)

JUNIOR YEAR

Units.	
(2)	Mil. Sci. and Tactics (4)
(2)	Physical Culture (4)
(4)	English 5, 6 (3)
(4)	English 7, 8 (2)
(8)	Mathematics 5, 6
(4)	Economics 1, 2, (2)
(4)	Economics 3, 4 (3)
(3)	Public Speaking 3, 4 (2)
(8)	Zo-ology 1, 2

Units.	
(8)	Mineralogy 1, 2
(4)	History 5, 6 (3)
(4)	History 7, 8 (2)
(4)	Sociology 1, 2 (3)
(2)	Sociology 3, 4—
(8)	Chemistry 5, 6
(8)	Engineering 3, 4 (4)
(2)	Photography 2 (2)
(4)	Mechanic Arts 7, 8 (2)

SENIOR YEAR

(4)	English 9, 10 (2)
(4)	English 11, 12 (3)
(4)	Psychology 1
(4)	Pedagogy 2
(4)	History 9, 10 (3)
(8)	History 11, 12 (3)
(4)	History of Art 1, 2 (2)
(8)	Geology 1, 2

(4)	Logic 1 (4)
(4)	Logic 2—
(3)	Ethics 2 (3)
(8)	Chemistry 7, 8
(8)	Engineering 5, 6 (4)
(8)	Engineering 7, 8 (4)
(4)	Engineering 9, 10 (3)
(4)	Engineering 11 (4)

CREDIT TOWARD DEGREES

Credit toward degrees is given by means of a unit system which assigns to each course of instruction offered a certain number of units of credit. One hundred twenty-eight units besides eight units in Military Science and Tactics and Physical Culture are necessary for obtaining a degree in any course. The number of units of work offered in different subjects is shown in the following scheme:

	Units.
English	32
Oratory	6
Mathematics	24
GROUP A.	
Latin	16
French	16
German	16
Spanish	16
GROUP B.	
History	28
Economics	8
Philosophy	19
History of Art	4
Artistic Drawing	4
Sociology	8

GROUP C.	Units.
Botany	16
Zo-ology	8
Chemistry	32
Met. Chem. and Ass'ng	8
Geology	8
Mineralogy	12
Physics	4
Photography	2
GROUP D.	
Mechanic Arts	20
Engineering	40

The units necessary for the degree of Bachelor of Philosophy are as follows:

I. Required—English, 24 units; Philosophy, 15 units; History and Economics, 8 units.

II. Group Electives—From Group A, 32 units; from Group C, 16 units.

III. Free Electives—33 units.

The units necessary for the degree of Bachelor of Science are as follows:

I. Required—English, 8 units; Mathematics, 16 units.

II. Group Electives—From Group B, 4 units; from Group C and D, 56 units.

III. Free Electives—44 units.

To obtain the degree of Bachelor of Science *in Mining* the following courses must have been elected:

Mechanic Arts, 1, 2; Engineering, 1, 2; Engineering, 3, 4; Engineering, 5, 6; Engineering, 7, 8; Mineralogy, 1, 2; Geology, 1, 2; Chemistry, 9, 10.

To obtain the degree of Bachelor of Science *in Chemistry* the student shall have received 32 units in Chemistry and 8 in Mineralogy.

To obtain the degree of Bachelor of Science *in Engineering* the student must complete Mechanic Arts, 1, 2, 3, 4, 5, 6 and 32 units in Engineering.

To obtain the degree of Bachelor of Science *in Agriculture* the following course is required:

Freshman Year—English, Solid Geometry, Trigonometry, Higher Algebra, Modern Language, Mechanic Arts.

Sophomore Year—Higher Algebra, Analytic Geometry, Meteorology, Chemistry, Surveying, Botany, Drawing, Farm Equipment, Soil and Irrigation.

Junior Year—Farm Crops, Breeds of Live Stock, Botany, Anatomy, Zo-ology, Entomology, Floriculture, Landscape Gardening, Forestry, Horticulture.

Senior Year—Stock Breeding and Feeding, Dairying, Veterinary Medicine, Geology, Fruits and Fruit Culture, Vegetables and Vegetable Culture.

EXPLANATION OF COURSES OF INSTRUCTION

(The hours mentioned are the hours of recitation per week.)

ENGLISH

PROFESSOR HALL

The purpose of the courses outlined below is to give a general knowledge of English literature from the sixteenth century to the present time. Chief stress is placed upon the study of a few authors of the most important periods, though the history of our literature is also traced from age to age.

The course in composition aims to develop accurate thought and clear, vigorous expression.

ENGLISH 1, 2. NINETEENTH CENTURY PROSE, CRITICISM AND BRIEF HISTORY. (a)—Appreciative, sympathetic criticism of the chief novelists and essayists of the nineteenth century, based upon careful study and comparison; lectures and discussions; frequent short themes upon assigned and chosen subjects. (b)—A brief survey of the history of English literature, with reading, lectures and discussions. Open to all students. Five hours both semesters. *(8)*

ENGLISH 3, 4. RHETORIC AND COMPOSITION—Expository and argumentative composition; briefs, themes, essays. Lectures and discussions. Text-books, MacEwan's Essentials of Argumentation, Genung's Practical Rhetoric and Rhetorical Analysis, Baker's Specimens of Argumentation (modern). Open to students who have taken English 1, 2. Three hours both semesters. *(8)*

ENGLISH 5, 6. ELIZABETHAN LITERATURE—Shakespeare, selected plays; other Elizabethan dramatists, especially Jonson and Marlowe; Spenser's Faerie Queene and shorter poems. Lectures and discussions. Open to students who have taken English 1, 2. Three hours both semesters. *(4)*

ENGLISH 7, 8. EIGHTEENTH CENTURY LITERATURE —From the death of Dryden to the publication of the Lyrical Ballads, 1700-1798; special attention given to the Queen Anne

period and the early romantic revival. Lectures and discussions. Open to students who have taken English 1, 2. Two hours both semesters. *(4)*

ENGLISH 9, 10. SEVENTEENTH CENTURY LITERATURE—From the closing of the theaters to the death of Dryden, 1642-1700. Lectures and discussions. Open to students who have taken English 1, 2. Two hours both semesters. *(4)*

ENGLISH 11, 12. NINETEENTH CENTURY POETRY—From the publication of the Lyrical Ballads to the death of Tennyson, 1798-1892. Lectures and discussions; Macmillan's Globe editions. Open to students who have taken English 1, 2. Three hours both semesters. *(4)*

RHETORICALS—The appearance in public rhetorical exercises or equivalent rhetorical work once during each semester is required of all students taking a University course in English, or taking any course of study leading to a degree.

LATIN

INSTRUCTOR STANLEY

The courses below are open to students who have completed the first two years of Latin in the sub-collegiate department, or an equivalent. The aim of the instruction is to impart a comprehensive knowledge of the language and literature. Constant, thorough drills are given in technical grammar and prose composition. In reading, the matter is subjected to grammatical, metrical, rhetorical and historical explanation. The study of the text is made the means of mental discipline, of developing the faculties of observation and critical judgment, and of acquiring habits of thoroughness and accuracy.

LATIN 1, 2. CICERO AND VERGIL—Cicero's Orations, the four Catilinarian; Vergil's Aeneid, six books. Allen and Greenough's texts. Sight-reading from Nepos, Gellius and Cicero; Daniell's Prose Composition throughout the year. Five hours both semesters. *(8)*

LATIN 3, 4. LIVY, HORACE, CICERO—Livy, Book XXI; Horace, selected Odes, Satires; Cicero, De Amicitia and De Senectute; Latin prose composition and sight reading. Open to students who have taken Latin, 1, 2. Four hours both semesters. *(8)*

MODERN LANGUAGES

ASSISTANT PROFESSOR PATTON

The student can in the following courses acquire a sufficient knowledge of the language to continue his studies independently. As far as practicable the language is spoken in the class-room to the end that the student may obtain an acquaintance with the spoken language.

GERMAN

GERMAN 1, 2—Kellner's German Grammar; Guerber's Maerchen und Erzaehlungen. Open to all students. Five hours both semesters. *(8)*

GERMAN 3, 4—Riehl's Der Fluch der Schönheit; Lessing's Minna von Barnhelm; Schiller's Marie Stuart, Jungfrau von Orleans; Goethe's Hermann und Dorothea, Iphigenia. Composition; collateral reading; essay writing. Open to students who have taken German, 1, 2. Four hours both semesters. *(8)*

SPANISH

SPANISH 1, 2—De Tornos's Combined Spanish Grammar; Worman's First and Second Spanish Readers; Loiseaux, Elementary Spanish Reader; Valdè, José. Open to all students. Five hours both semesters. *(8)*

SPANISH 3, 4—Maratin, El si de las Niñas; Alarcón, El Capitán Veneno; Galdos, Doña Perfecta; Cervantes, Don Quixote. Open to all students who have completed Spanish 1, 2. Four hours both semesters. *(8)*

FRENCH

FRENCH 1, 2—Whitney's French Grammar, Part I; Super's French Reader; Halévy, L'Abbé, Constantin; Mérimée, Colomba Moliére, Le Médecin Malgré Lui and Le Bourgeois Gentilhomme. Open to all students. Five hours both semesters. *(8)*

FRENCH 3, 4—Whitney's French Grammar, Part II; Racine, Athalie; Corneille, Le Cid; Balzac, Eugene Grandet; Daudet, Morceaux Choisis; Hugo, Les Miserables (abridged); Rostand, Cyrano de Bergerac. Open to students who have taken French 1, 2. Four hours both semesters. *(8)*

HISTORY, POLITICAL SCIENCE AND PHILOSOPHY

PRESIDENT ADAMS

INSTRUCTOR BUTTERFIELD

In the work in history emphasis is placed on the social and political development, the relation of cause and effect and the unity of history. The laboratory method is used wherever possible and individual work insisted upon. In political science the historical method is used, and the subject rather than any one writer's presentation of it is treated. After a brief presentation of pure economics, the course deals with practical questions. The course in philosophy is arranged with especial attention to the needs of teachers. Upon its completion graduates of the University will receive Territorial Teachers' certificates.

HISTORY

HISTORY 1. 2. ENGLISH HISTORY—Green's Short History of the English People used as a basis; much assigned reading. A thesis is required. Open to all students. Four hours both semesters. *(8)* (Miss Butterfield.)

HISTORY 3, 4. AMERICAN COLONIAL HISTORY—A detailed study of the American colonies under Great Britain, and of the United States to the adoption of the Constitution. Lectures and assigned reading. A thesis is required. Open to students who have taken History 1, 2. Two hours both semesters. *(4)*

HISTORY 5, 6. ECONOMIC HISTORY OF THE UNITED STATES—A study of the causes and development of the economic history of the United States. Lectures and assigned reading. A thesis is required. Open to students who have taken History 1, 2. Three hours both semesters. *(4)*

HISTORY 7, 8. SPANISH AMERICAN HISTORY—Spanish settlement and administration during the colonial period; the growth and development of the Southwest, with special reference to Arizona. Lectures and assigned reading. Open to all students. Two hours both semesters. *(4)*

HISTORY 9, 10. CONSTITUTIONAL HISTORY OF THE UNITED STATES—A detailed study of the formation of the

Union and of the political and constitutional history of the United States, based on letters and speeches of American statesmen, public documents and special histories. A thesis is required. Open to students who have taken History 3, 4. Three hours both semesters. *(4)*

HISTORY 11, 12. THE HISTORY OF AMERICAN POLITICAL PARTIES—A seminary course covering the origin, development and principles of political parties from 1782 to the present time. Johnston's American Politics and Stanwood's History of the Presidency will be the basis of the course but the work will require much reading and investigation and a thesis. Open to Juniors and Seniors. Three hours both semesters. (Will not be given in 1903-04.)

POLITICAL SCIENCE

ECONOMICS 1, 2.—A study of the general principles and laws of political economy. Text-book, Walker's Advanced Political Economy. Open to Juniors and Seniors. Two hours both semesters. *(4)*

ECONOMICS 3, 4—A study of economic and sociologic problems, such as the currency question, tariff reform, banking, taxation and similar subjects. Lectures and assigned reading. A thesis is required. To be preceded or accompanied by Economics 1, 2. Three hours both semesters. *(4)*

PHILOSOPHY

PSYCHOLOGY 1—A special consideration of the subject as applied to teaching. Lectures, recitations and collateral reading. Open to Juniors and Seniors. Five hours first semester. *(4)*

PEDAGOGY 2—An account of educational evolution, both as a culture fact in the history of civilization and as a foundation for professional work; lectures, giving a brief but comprehensive outline of the school systems of ancient, mediaeval and modern countries with a special study of leading educators, such as Socrates, Commenius, Pestalozzi, Froebel, Mann and others; the present trend of pedagogical thought and practice, methods of teaching, school management, art of questioning and school law. Arrangements have been made with the Tucson city schools to use the Holliday school as a practice school for this class. Open to students who have taken Psychology 1. Five hours second semester. *(4)*

LOGIC 1—Text-book, Jevons's Logic; reading from Mill, Hamilton, Thompson and others. Open to Juniors and Seniors. Four hours first semester. *(4)* (Professor Woodward.)

LOGIC 2—A brief history of the development of scientific thought and related philosophical ideas. *(4)* (Professor Woodward.)

ETHICS 2—Theoretical and practical ethics; view of the historical development of the science; origin and development of the moral consciousness; application of the principles of ethics to the problems of life. Lectures, discussions and assigned reading. Open to Juniors and Seniors. Three hours second semester. *(3)* (President Adams.)

HISTORY OF ART

INSTRUCTOR BUTTERFIELD

HISTORY OF ART 1, 2—A brief resume of the history of the fine arts of architecture, painting and sculpture from the earliest time. Text-book with assigned reading and informal talks. Whenever possible students will be required to obtain reproductions of the masterpieces for the note book. Open to Juniors and Seniors. Two hours each semester. *(4)*

SOCIOLOGY

SOCIOLOGY 1. ELEMENTS OF SOCIOLOGY—A study of the characteristic concepts of sociological thought, designed to acquaint the student with the current theories of social interpretation. The course will include a discussion of the elements of association underlying social relations and institutions; the result of race, group, and individual competition; and some of the conditions of social progress. Fairbanks's Introduction to Sociology will be used as a guide, and supplemented by lectures, collateral reading, and reports. Open to Juniors and Seniors. Three hours first semester. *(2)*

SOCIOLOGY 2. CHARITIES AND CRIME. A consideration of social pathology, including an examination of the origin and nature of the dependent, defective, and delinquent classes. A study will be made of the principles and methods of relief; causes of crime; prison systems; juvenile offenders;

preventative measures, etc. Guide: Warner's American Charities. This course is intended to be a continuation of Sociology 1, and will alternate with Sociology 4. Prerequisite, Sociology 1. Three hours second semester. *(2)*

SOCIOLOGY 3. PUBLIC OPINION—After examining the concept of the Social Mind, a study will be made of the growth, and guidance of public opinion, the psychology of fashion and fads, the psychology of epidemics, the psychology of crowds or mobs, and the function of public opinion in the guidance of national life. Lectures, reading and reports. Open only to advanced students. Prerequisite, Sociology 1. Not given in **1903-04.** *(2)*

SOCIOLOGY 4. THE FAMILY—A study of domestic institutions in lower and higher civilizations. Attention will be given to the social ethics of the family, and to the legal, industrial, educational, and religious problems of the family. Westermark's History of Human Marriage will be used as a text. To alternate with Sociology 2. Prerequisite, Sociology 1. Three hours second semester. *(2)*

MATHEMATICS

PROFESSOR WOODWARD, PROFESSOR SMITH.

It is the aim of the work in mathematics to train the student to the habit of logical and vigorous courses of reasoning, to show the wonderful breadth of application of higher mathematics, to display the beauties and pleasures of the demonstrations, methods, and results of higher geometry and calculus, and to give such practice in the use of these agents as will enable students who pursue the higher branches of engineering to use them naturally and easily in those numberless applications where they are indispensable.

MATHEMATICS 1, 2. SOLID GEOMETRY: HIGHER ALGEBRA—Geometry one-third year; text-book, Wentworth's Solid Geometry, Algebra two-thirds year; text-boox, Downey's Higher Algebra. Open to all students. Five hours both semesters. *(8)*

MATHEMATICS 3, 4. TRIGONOMETRY: ANALYTIC GEOMETRY—Trigonometry one-third year; text-book, Wells's Complete Trigonometry. Analytic Geometry two-thirds year;

text-book, Nichols's Analytic Geometry. Open to all students who have taken Mathematics 1, 2. Five hours both semesters. *(8)*

MATHEMATICS 5, 6. CALCULUS: MECHANICS—Calculus first semester, differential and integral, with special reference to their use in the various branches of engineering. Lectures and recitations; text-book, Hall's Differential and Integral Calculus. Mechanics second semester; composition and resolution of forces; energy; revolving bodies; moment of inertia; impact; stress and strain in materials; graphical and analytical determination of stresses in ties, beams, columns, shafting, and in the members of bridge and roof trusses. Open to students who have taken Mathematics 3, 4, and Physics 1, 2. Five hours both semesters. *(8)*

BIOLOGY

PROFESSOR THORNBER

The courses which follow are calculated to articulate with the work done in biology in average western high schools.

BOTANY 1, 2. GENERAL BOTANY—Botany 1 treats of the general principles of the histology and physiology of plants. Botany 2 completes the year's work with a general survey of plant types from Protophyta to Spermatophyta; also the elementary principles of field botany. Guide, Bessey's Essentials of Botany, supplemented with other texts and lectures. The laboratory studies will form the basis of all the work. Open to all students. Five hours, or an equivalent, both semesters. *(8)*

BOTANY 3, 4. ADVANCED BOTANY—The second year's work is not definitely outlined, but is purposely left open to be formulated as the needs of the students applying appear to demand. Courses in general morphology of the fungi, morphology of the fungi with special reference to forms injurious to vegetation in the Southwest, also histology, physiology and the taxonomy and ecology of the native flora and allied subjects are offered here. Opportunities are offered for research work. Open to all students who have taken Botany 1, 2. Five hours, or an equivalent, both semesters. *(8)*

ZO-OLOGY 1, 2. Conducted along lines corresponding very closely to those followed in Botany 1, 2. Laboratory studies as in that course are made the main feature of the work which is based upon living, native material where such is available; but some groups are necessarily studied by the aid of preserved specimens. In the study of the Mammalia constant reference is made to human anatomy, so that this portion is made in part a review of the course in anatomy and physiology offered in the sub-collegiate department. Text-book, Parker and Hazwell's Manual of Zo-ology. Open to all students. Five hours, or an equivalent, both semesters. *(8)*

PHYSICS

PROFESSOR SMITH

The object of this course is to acquaint the student with the physical principles which underlie the higher courses of chemistry, mechanics and engineering. Special attention is therefore given to the study of force and energy, the physics of liquids and gases, and heat. One-third of the course will be devoted to the study of electricity, the equipment for which has been greatly augmented during the past year through the liberality of Dr. H. W. Fenner and Hon. Rochester Ford, both of Tucson.

PHYSICS 1, 2. Lectures, recitations and laboratory work. Open to students who have taken a course in elementary physics and Mathematics 3. Two hours, or an equivalent, both semesters. *(4)*

CHEMISTRY

PROFESSOR GUILD

The instruction in chemistry has two main objects in view: first to promote general culture; and secondly, to introduce students to technical work, especially in mining. The first two years' work in general chemistry, qualitative and quantitative analysis, places the student in a position to take up advantageously the study of mining, agricultural chemistry or metallurgy. The third year's work, metallurgical chemistry, can be pursued to advantage only by advanced students. The larger portion of the work, being investigative, requires on the part of the student a certain amount of originality and ingenuity in designing and carrying out experiments. The experience which a student may gain in this work is of great value to him in conducting an assay laboratory or in filling the position of superintendent of a metallurgical plant.

CHEMISTRY 1. GENERAL CHEMISTRY—Lectures illustrating the chemical properties of the elements and their compounds, supplemented by recitations and laboratory practice. Text-books, Remsen's Briefer Course. Open to all students. Five hours, or an equivalent, first semester. *(4)*

CHEMISTRY 2. QUALITATIVE ANALYSIS — Practical work in the laboratory, including the analysis of alloys, commercial products, minerals, and like substances. The course is accompanied by lectures and recitations. Text-book, Eliot and Storer's Qualitative Analysis, and various reference books. Open to students who have taken Chemistry 1. Five hours, or an equivalent, second semester. *(4)*

CHEMISTRY 3. 4. QUANTITATIVE ANALYSIS—Laboratory practice, with lectures and recitations; gravimetric, volumetric, gasometric, calorimetric and electrolytic methods of analysis; quantitative analysis of silicates, minerals, and mattes. Text-books, Fresenius's Quantitative Analysis, Sutton's Volumetric Analysis, and various reference books. Open to students who have taken Chemistry 2. Five hours, or an equivalent, both semesters. *(8)*

CHEMISTRY 5, 6. METALLURGICAL CHEMISTRY AND ASSAYING—Assaying of gold, silver and lead by the furnace method; bullion assaying according to the methods employed in the United States Mint; cyanide process for the extraction of gold; the assaying of cyanide solutions, precipitation of gold, and the treatment of the zinc residues; the chlorination process; the leaching of silver ores by hyposulphite; preparation and analysis of alloys, with a study of their properties; analysis of iron and steel, fuels and furnace gases. Open to students who have taken Chemistry 3, 4. Five hours, or an equivalent, both semesters. *(8)*

CHEMISTRY 7, 8. ORGANIC CHEMISTRY—Lectures on the carbon compounds; laboratory work in organic analysis and the preparation of organic compounds; vapor density and molecular weight determination. Open to students who have taken Chemistry 3, 4. Five hours, or an equivalent, both semesters. *(8)*

CHEMISTRY 9, 10—A course, especially designed for students who desire to take the degree of B. S. in Mining Engineering. It includes parts of the work in courses Chemistry 3, 4 and Chemistry 5, 6. Open to students who have taken Chemistry 2. Five hours, or an equivalent, both semesters. *(8)*

MINERALOGY

PROFESSOR GUILD

The main object of the course in mineralogy is to familiarize the student with facts and methods that will enable him to determine the character of an ore or mineral by an observation of its physical properties and by the performance of a few simple tests with the blow-pipe. The value of such a course cannot be over-estimated, since these quick methods of analysis are frequently needed in the field and mine when recourse cannot be had to a well-equipped chemical laboratory. The course is of value also to the student of general science, since it adds to the pleasure of a day in the mountains or field, and is necessary to a full appreciation of the study of geology. The course is not only practical, but the theoretical side of the subject receives attention in mineral optics, crystallography and similar topics.

MINERALOGY 1, 2—Lectures and recitations in crystallography and the classification and uses of minerals; laboratory work in blow-pipe analysis and determinative mineralogy; work with the reflecting goniometer in measuring the angles of crystals, and with the polariscope in studying the optical properties of minerals; the study of a type collection of 600 minerals arranged and classified according to Dana. Text-books, Dana's Text-book of Mineralogy and Brush's Manual of Determinative Mineralogy and Blow-Pipe Analysis. Open to students who have taken Chemistry 2. Five hours, or an equivalent, both semesters. *(8)*

MINERALOGY 3—Lectures and recitations on the classification and uses of minerals; laboratory work in blow-pipe analysis and determinative mineralogy; the study of a type collection of minerals. Text-books, same as in Mineralogy 1, 2.

Open to students who have taken Chemistry 2. Especially designed for students in the two years' mineralogy and assaying course. Five hours, or an equivalent, second semester. *(4)*

PHOTOGRAPHY

ASSOCIATE PROFESSOR SKINNER.

PHOTOGRAPHY 2. The course in photography is designed to meet the needs of mining and engineering students. No attempt is made to teach the subject as an art; but the student is instructed in the use of the camera, the various processes of the development and making of photographs, and the uses and applications of photography in the applied sciences. Lectures are given upon the chemical and physical action of light, and photographic optics, and a survey of the University campus is made by the photographic method. The course presupposes an elementary knowledge of chemistry and physics. Open to members of the Sophomore, Junior, and Senior classes, and to such special students as are qualified to take the work. Lectures one hour, laboratory work two to four hours, second semester. *(2)*

ASTRONOMY

PROFESSOR BLAKE

A short course of instruction in astronomy is given as an introduction to the study of geology. In this course the relations of the earth to the solar and stellar systems are considered as also are the form of the earth and its motions in their relations to climate and to geologic changes. The astronomy being considered a part of geology is granted no independent credit toward any course of study. Open to Seniors. Lectures and recitations.

GEOLOGY

PROFESSOR BLAKE

The objects of the course of instruction in geology are chiefly general culture and practical advantages gained in agriculture and mining. The student is instructed regarding the changes that have taken place upon the globe; in the formation of rocks, soils and mineral deposits, and in the progress of life and the environment of humanity.

GEOLOGY 1. *General Geology*— Astronomical introduction. (See Astronomy, above.);

Geology. Geognosy—The formation and composition of the crust of the earth, rock-forming minerals, crystalline and mechanically and chemically formed rocks;

Dynamic Geology— Erosive agencies, transportation and deposition of rock-forming materials; the origin of soils and their distribution; volcanic formations, metamorphism;

Structural Geology—Stratification and the movements to which strata have been subjected; uplifts and depression; folding and complication; origin of mountain chains;

Historical Geology— The sequence of formations—the geologic record; origin and progress of life; theories of selection and evolution; paleontology.

Five hours first semester. *(4)*

GEOLOGY 2. *Economic Geology*—In the second semester a course of lectures is given upon the nature and origin of mechanically-formed deposits; upon the various theories of origin and the systems of classification, followed by a description in detail of the form of occurrence of useful minerals and ores as shown in the following outline list:

Iron, chromium, aluminium, manganese, nickel and cobalt.

Copper, zinc, cadmium.

Tin, mercury, antimony and arsenic.

Lead and silver-lead ores.

Silver, gold, platinum and "the platinum metals."

Molybdenum, vanadium, uranium and tungsten—their compounds, properties and uses.

Coal, coke, asphalt, Utahite, ozocerite petroleum and natural gas.

Building and fictile materials—granite, sandstone, tufas, limestone, cements, gypsum, clays, marble, onyx and other ornamental stones.

Abrasives and gems, including emery, corundum, diamonds and garnet.

Soluble salts; as salt, nitre, borax, natron and Thenardite.

Lectures illustrated by ores and specimens from the museum, by maps and sections of mines, drawings and original notes and descriptions of the more important mineral deposits and mines of North America; especially of the Comstock and other lodes in Nevada; of the copper mines in Arizona, including the United Verde, Copper Queen, and others; the gold mines of the Appalachians, California, Alaska and Arizona, including the mines of Tombstone, Congress, Pearce and Fortuna, the Cananea copper mines and other mines in Mexico. Text-book, Kemp's Ore Deposits of the United States. Open to Seniors and special students who have taken chemistry, mineralogy and geology 1. Five hours first half of second semester. *(4)*

After the completion of the course of lectures upon Ore Deposits in the first portion of the second semester, lectures will be given upon mining and metallurgical machinery and methods intended to supplement the instruction given by the professors of engineering.

These lectures will cover especially the subjects of tramways and hoisting ore; the construction and management of rock and ore crushers; stamp mills, their construction and management; self-feeders; amalgamation, etc.

The construction and management of jigs, shaking tables and other forms of concentrators, including dry-concentrators, pneumatic jigs, etc. Roasting and calcining furnaces, melting and refining bullion, and mill practice, so far as opportunity offers.

MECHANIC ARTS

PROFESSOR HOLMES

The mechanic arts courses comprise the elements of drawing and shop work. The work consists of lectures, recitations, drawing and tool and machine work. The courses are designed with special regard for the needs of the student in engineering.

MECHANIC ARTS 1. (a) Free hand lettering, one month; Reinhardt's slanting and upright styles; titles and tabulated data. (b) Mechanical drafting, one month; care and use of instruments; Reinhardt's "Technic of Mechanical Drafting"; geometrical construction; tracing; blue printing. (c) Orthographic projections, two months; the third angle method of descriptive geometry of plane sided forms and surfaces of revolution. Open to all students. Five hours, or an equivalent, first semester. *(4)*

MECHANIC ARTS 2. (a) Bench work in wood, two months; characteristics and properties of wood; care and use of wood-working tools; principles of joinery. (b) Wood turning, one month; care and use of wood lathe and tools; application of wood turning in pattern making. (c) Forging, one month; properties of iron and steel, methods of manufacture; care of fire; use of forging tools; tool-making and tempering. Open to all students. Five hours, or an equivalent, second semester. *(4)*

The Mechanic Arts courses 1, 2 are required of Freshmen in engineering. The greater part of the time is spent in the drafting room and shops.

MECHANIC ARTS 3, 4. (a) Bench work in iron, one month; wrought and cast iron; use of hammer, file, chisel, and scraper. (b) Machine work in iron, two months; use of engine lathe in turning, boring and thread cutting; drilling machine. (c) Planing and milling machines, one month; special study of comparative efficiency of each in producing similar work. Required of engineering students. Open to students who have taken Mechanic Arts 1, 2. Two hours, or an equivalent, both semesters. *(4)*

MECHANIC ARTS 5, 6. Descriptive Geometry; this course is a continuation of Mechanic Arts 1 (c) surfaces of transcendental shades and shadows, linear perspective. Required of engineering students. Open to all students who have taken Mechanic Arts 1, 2. Two hours, or an equivalent, both semesters. *(4)*

MECHANIC ARTS 7, 8. Gear cutting and tool making—Elective. Open to students who have taken all previous Mechanic Art courses. Two hours, or an equivalent, both semesters. *(4)*

NOTE—Graphical Statics and Kinematics are taught in connection with the engineering courses.

ENGINEERING

PROFESSOR WOODWARD, PROFESSOR SMITH.

The courses offered under this head are selected with reference to the local conditions and needs of the Territory. While they are made as technical as is possible without sacrificing in other directions, yet the fact is constantly borne in mind that engineering practice changes from year to year, and that a graduate who is thoroughly grounded in the principles of his profession will readily acquire the technical side. The former is necessary; the latter desirable.

ENGINEERING 1, 2. SURVEYING—Use and care of instruments, including plain and solar compasses, levels, transits; plane land surveying; United States system of land surveys; city, topographical and mine surveying; earthwork computations; determination of azimuth, latitude, longitude and time by observations on the circum-polar stars and on the sun. One full half-day each week is devoted to field practice; plots are made of field surveys and a topographic map of some area in the vicinity of Tucson is executed by each student. Lectures, recitations, drawing and field work. Text book, Raymond's Surveying. Open to students who have taken Trigonometry. Three hours both semesters and Saturday forenoons. *(8)* (Smith.)

ENGINEERING 3. MINE ENGINEERING—Prospecting; exploratory workings; boring with percussion and diamond drills; hand and machine rock drills; explosives; blasting; laying out of workings; timbering; methods of winning the ore; hoisting and hoisting engines; underground transportation; mine ventilation. Text-book, Ihlseng's Manual of Mining supplemented by lectures. A portion of the time is devoted to drawing engineering structures such as shaft timbering and steel headframes. Open to students who have taken, or are taking, Mathematics 5, 6. Four hours first semester. *(4)* (Smith.)

ENGINEERING 4. METALLURGY OF IRON AND STEEL, COPPER AND LEAD—(a) Production of pig iron, wrought iron and steel; thorough study of the blast furnace, its construction, management, charge, and products; direct process for wrought iron; puddling, Bessemer, open hearth and crucible processes. (b) Copper; the preparation and roasting of ores; smelting; converting of mattes; refining; general arrangement of plant. (c) Lead; sampling and purchasing of ores; smelting in the various types of furnaces; desilverization of base bullion. Drawing is made a feature of this course as of

Engineering 3. Open to students who have taken Mathematics 5, 6. Four hours second semester. *(4)* (Smith.)

ENGINEERING 5, 6. (a) Engineering construction one-third year; masonry construction; piers, dams, retaining walls, arches; graphical investigation of stability; use of concrete; pile foundations. (b) Hydraulics one-third year; velocity and discharge from orifices; weirs, tubes and pipes; flow in sewers; ditches, canals, and rivers; energy of a jet; measurement of water power; water wheels of various types. Text-book, Merriman's Hydraulics. (c) Ore dressing one-third year; crushing and pulverizing machinery; sizing; hydraulic classifiers; jigs, vanners, and tables; magnetic separation. Lectures and experimental work with concentrating machines. Open to students who have taken Mathematics 5, 6. Four hours both semesters. *(8)* (Smith.)

ENGINEERING 7, 8. MECHANICAL ENGINEERING. Kinematics of machinery; elementary thermodynamics; theory of the steam engine; types of engines; steam valves and valve diagrams; theory and use of the indicator; compound engines; heat and combustion of fuel; types and management of boilers; design of chimneys. Lectures, recitations, drawing, and exercises in the shops and laboratories. Text-book, Kinealy's Steam Engines and Boilers. Open to students who have taken Mechanic Arts 3, 4 and Mathematics 5, 6. Four hours both semesters. *(8)* (Woodward.)

ENGINEERING 9, 10. POWER AND POWER TRANSMISSION—A study of the different sources from which power is obtained; steam, gas, oil, hot-air, and hydraulic engines; the wind and sun as sources of power; the various agencies for the distribution and transmission of power. Open to students who have taken Mechanic Arts 3, 4 and Mathematics 5, 6. Three hours both semesters. *(4)* (Woodward.)

ENGINEERING 11. RAILROAD ENGINEERING—Preliminary and location surveys; simple and easement curves; turnouts and switches; principles of economic location as based upon cost of construction, operating expenses, alignment and grades; maintenance-of-way. The field work consists of the surveys for a line of railroad of sufficient length to secure familiarity with the methods of actual practice. Each student makes a complete set of notes, maps, profiles, calculations and estimates of cost. Open to students who have taken Engineering 1, 2. Four hours until December, one hour and Saturdays through December and January. *(4)* (Smith.)

The value of the engineering courses, especially in designing, is enhanced by a collection of blue-prints of actual constructions. The University is indebted to Fraser & Chalmers of Chicago and the Union Iron Works of San Francisco for gifts of blue-prints of mining machinery, including roasters, smelters, converters, hoisting frames and engines, and stamp mills.

The Cambria Steel Company of Johnstown, Pa., has recently presented to the institution a collection of the different grades of iron and steel, giving all the chemical and physical data regarding each, and also a series of samples, each six inches long, of structural steel shapes.

MINING EXCURSIONS

In connection with the courses in Engineering 3, 4, and Mineralogy two trips will be made to mining districts of Arizona and Sonora, one in December and one in March. These trips are required of all candidates for the degree of B. S. in Mining.

The purposes of these trips is to afford the mining students an opportunity for close study and inspection of mining and metallurgical plants, and of rock formations and minerals of commercial value. The students are accompanied by two professors, and every effort is made to make the trips of the greatest practical value. The visits are carefully scheduled, and notes, with sketches, measurements and photographs are taken, and elaborated into a comprehensive report by each student after the return. These trips are of incalculable assistance to the lecture, text-book and draughting room work.

The subjects of special consideration are transportation, both above and below the surface, mine surveying, methods of stoping and timbering, the best treatment for each ore, assaying and furnace charges, smelting practices, concentration of low grade ores, power generation, pumping and water supply, and mill construction.

The last two trips have been to Bisbee and to the Copper

Mountain mining district. Great credit is due the superintendents of the mining plants visited for their efforts and care in acquainting the students with the works under their management. The institution is especially indebted to the Copper Queen Mining Company and the Arizona Copper Company for free transportation over the A. & S. E. Ry. and the A. & N. M. Ry.

ARTISTIC DRAWING

PROFESSOR HOLMES

ARTISTIC DRAWING 1, 2—Decorative composition and artistic drawing; a study of design and ornament; rendering in pen, ink and water colors. Open to all students. Two hours or an equivalent both semesters. *(4)*

PUBLIC SPEAKING

INSTRUCTOR GORBY

The object of these courses is to give instruction and training in the principles of expression. Special attention is paid to developing the voice, to strengthening all the powers of the voice and body and to bringing these powers into perfect harmony, that the student may adequately express his ideas. This training is to afford means for general culture, to induce more careful study of and a deeper insight into the meaning and purpose of the great masters of literature.

PUBLIC SPEAKING 1, 2—Study of the philosophy of expression, analysis of voice, quality, force, stress, pitch, besides a thorough training in the art and practice of extempore speaking. Text-book, Fulton and Trueblood's Practical Elocution. Two hours both semesters. *(3)*

PUBLIC SPEAKING 3, 4. ADVANCED COURSE—Analysis and interpretation of higher forms of literature. Study of great orators and their productions. Preparation and delivery of original orations. To achieve the best results a student must have a knowledge of rhetoric, logic, psychology and English literature. Lectures and class drill. Open to Juniors and Seniors who have completed Public Speaking 1, 2. Two hours both semesters. *(3)*

NOTE—Students may obtain an additional unit of credit for work in Public Speaking by making special arrangements with the instructor.

PHYSICAL CULTURE

INSTRUCTOR BUTTERFIELD

The course in physical culture affords a means for the acquisition of health, strength and grace. The practical part of the work consists of free gymnastics and exercises with light apparatus. Special attention is given to exercises for correct carriage of the body in sitting, standing and walking. Lectures in physiology, hygiene, food, and dress furnish the theoretical part of the course. Open to all women students. Required of all below the Junior year, unless they be excused on account of physical disability; those so excused are required to elect a subject in place of physical culture. Juniors who elect this subject may receive credit to the extent of two units. Four hours both semesters.

MILITARY SCIENCE AND TACTICS

MAJOR PATTON

PRACTICAL COURSE—Exercises on the drill ground covering (a) Infantry exercises in the schools of the soldier, company and battalion; extended order movements, target practice, reviews and parades. (b) Military signaling with flag; telegraphy. Required of all able-bodied male students throughout the Freshman and Sophomore years and elective during the remainder of the course. Juniors who elect this course may receive credits to the extent of two units. Four hours both semesters.

THEORETICAL COURSE—Recitations covering the infantry drill regulations with lectures on military law, discipline, military history, and allied topics. Required of all commissioned and non-commissioned officers.

Students claiming exemption from drill will be required to secure a certificate of disability from a physician designated by the faculty unless the disability is apparent. Those so excused will be required to elect a subject in place of this course.

The officers will be appointed from an eligible list determined by examination, both scholarship and class standing being taken into account.

Each member of the military organization will be required to provide himself with the required uniform within six weeks after his entrance. A deposit covering the cost of the uniform should be made upon registration. The uniform consists of cap, coat and trousers of cadet gray cloth trimmed with black braid and closely resembles the undress uniform of the United States Military Academy at West Point.

ATHLETICS

Encouragement is given to athletics and athletic organizations are under the immediate care of a committee of the faculty. All petitions for raising money must be approved by this committee. The director of the gymnasium will be in direct charge of all those preparing for athletic contests of any kind. Those competing for places on any of the athletic teams must maintain good standing in all subjects.

GYMNASIUM

It is expected that an instructor will be placed in charge of the new gymnasium who will offer such courses as may be demanded at the time. These courses will be elective except that students excused from drill and physical culture will be required to take special courses suited to their needs.

SHORT COURSE OF INSTRUCTION IN MINERALOGY AND ASSAYING

In order to meet the needs of persons who desire to learn the art of assaying the common ores and who have not the time required for a full four years' course of study the Board of Regents has approved a short course of instruction in practical assaying, mineralogy, metallurgy, and allied subjects.

This course commences with the first semester in each year and requires at least two years; students are advised, however, to take the regular course in engineering and mining, if possible, since in two years they cannot expect more than to make a beginning in these subjects.

REQUIREMENTS FOR ADMISSION

Those desiring to take this course are required to be at least eighteen years of age, to have good health, and to have a knowledge of English, mathematics and elementary science sufficient to enable them to pursue the course with advantage. For elementary science, physics, and for mathematics, algebra to quadratics is sufficient.

Instruction is gratuitous, but each student is required to pay a matriculation fee of five dollars and to pay the cost of materials, glassware, and apparatus used by him. For this purpose a deposit of ten dollars will be required in advance each semester and any balance will be refunded.

The right is reserved to vary this course according to the aptitudes or necessities of those concerned.

FIRST YEAR

General chemistry, one semester.

Qualitative analysis, one semester.

Mathematics, two semesters.

English or Spanish, two semesters.

Practical free-hand drawing and shopwork, or physics, two semesters.

SECOND YEAR.

Mineralogy and blow-pipe analysis, two semesters.

Assaying, one semester.

Quantitative analysis and wet assaying one semester.

Mathematics, two semesters.

Geology, two semesters.

TEXT-BOOKS

The following text-books and others are used:

Chemistry—Remsen, Eliot & Storer, Fresenius.

Assaying—Ricketts, Brown, Furman, Aaron.

Mineralogy—Dana; Brush's Determinative Mineralogy, revised by Penfield.

Geology—Dana, LeConte, Geikie; Kemp, Ore Deposits.

BUREAU OF MINES AND ASSAYING

A separate department of the School of Mines, under the name of "The Bureau of Mines and Assaying" has been established to receive and work ores, and to make assays and analyses of ores, minerals, mineral waters and petroleum.

In accordance with the act of the Legislature of the Territory, approved March, 1897, and amended in March, 1899, assays of ores and minerals are made for the prospectors and miners of Arizona, and for others, at fixed rates established by the law, and tabulated below. To meet the requirements of this work a special laboratory building of brick has been erected and maintained. It is fitted up as a complete assay office, and is provided with a double large brick coke-furnace, a melting furnace and gasoline furnaces in a fire-proof room. There are in addition, a parting and wet assay room, a balance room, and office, as shown upon the accompanying plan.

Extreme accuracy and excellence of work are considered of more importance than pecuniary profits. All assays are made in duplicate and if not accordant are repeated. A special expert assayer is employed, and the assays are not made by students, who receive their instruction in the laboratories of the main building.

The money received for assaying is deposited monthly to the credit of the assay fund which is used to pay the assayer and the cost of materials and apparatus.

SCHEDULE OF RATES FOR ASSAYING AND WORKING ORES

In accordance with the Legislative enactment approved March 3, 1899, the rates for assaying heretofore in force under the law of 1897, have been changed. The fifty-cent rate is no longer in force. Former circulars and schedules of rates are revoked and withdrawn. Under the provisions of the new law, the regents of the University of Arizona have established the following rates for assaying ores taken from deposits and mines in the Territory of Arizona:

ASSAYING ORES FROM ARIZONA

Silver and Gold, or either	$1.00
Silver, Gold and Copper	2.00
Copper	1.00
Lead	1.00
Zinc	1.00
Iron	1.00
Gold, Silver, Copper and Lead	2.50
Gold, Silver, Copper and Iron	2.50
Gold, Silver, Copper and Zinc	2.50

The following rates have been established by the Board of Regents for assaying ores taken from deposits or mines without the Territory of Arizona:

ASSAYING ORES FROM WITHOUT THE LIMITS OF ARIZONA

Silver and Gold, or either alone	$1.00
Copper	1.00
Lead	1.00
Zinc	2.50
Iron	2.00
Silica	1.50
Alumina	5.00

And for other determinations and analytical work such rate as the Director of the School of Mines may in each instance fix.

PAYMENT IN ADVANCE REQUIRED

The Director is required, in all cases, to hold the assay until the fee or charge therefor is paid. Remittances may be made by check or money order; or the money, securely wrapped, may be sent with the sample.

RATES FOR SAMPLING AND WORKING ORES

Lots of 100 pounds or less, including assays of three metals	$ 5.00
Each additional 100 pounds, to 500 pounds	1.00
Over 500 pounds, to 1 ton	10.00
Each additional ton	4.00
Ordinary stamp mill test and plate amalgamation, for first ton or fraction of a ton	20.00

From 1 to 2 tons	30.00
Pan amalgamation, including crushing and assays, ton	20.00

Large lots proportionately less; small lots more in proportion.

CYANIDE PROCESS

The School of Mines is prepared to make experimental tests of ores and tailings by the cyanide process, in large or small quantities, at rates to be agreed upon with the Director.

Working tests and experiments by other processes may be undertaken at rates to be agreed upon in each instance, depending upon the amount of materials, time and labor required.

CONCENTRATING (INCLUDING ALL ASSAYS)

Wet or dry test of small lot (under 500 pounds)	$15.00
500 pounds to 1 ton	20.00
Each additional ton	7.00

GRATUITOUS QUALITATIVE TESTS

The determination of the nature of rare and peculiar minerals, not requiring a chemical analysis, or an assay, is made gratuitously. Samples sent for this purpose should be in their original condition as broken out, and not crushed to a powder or pulp. Tests requiring determination of the presence of gold or silver must be paid for at assay rates. Samples may be sent by mail at the rate of one cent per ounce. They should be distinctly labeled inside the package with the name of the sender, and a letter should be posted at the same time giving the full name and address, and inclosing a stamp for the reply. This offer of free examination is intended to apply to minerals unknown to the sender and does not cover special tests for precious metals or for any metal the presence of which is usually determined by an assay.

BULLION ASSAYS

Special attention is given to the retorting and melting of bullion and the assays of gold bars for shipment.

ANALYSIS OF WATER

The Bureau is prepared to undertake the analysis of ordinary or mineral waters.

HOW TO SEND SAMPLES

For small samples, under four pounds in weight, the most expeditious and cheapest way is to send by the ordinary mail. If samples or letters containing the postal order are sent by registered mail, a delay of from one to three days is caused, as notice of arrival is given first and then the registered parcel must be sent for. A similar delay results from sending by express. The express company does not deliver parcels at the University. Delays often result from the want of identification. Sometimes the only clue to the name of the sender is the comparison of the handwriting upon the sample and that upon the letter. The postal laws permit the name of the sender to be written and inclosed in the package. Each sample should be labeled by a slip of paper, inside, giving the name and locality of the claim and the name of the sender.

The name of the claim is desired in order that the value and distribution of the mineral wealth of the territory may be better known.

Special rates for freight on consignments to the "Director of the School of Mines," are granted by the Southern Pacific railroad from points in Arizona. Ask the agent at shipping point for particulars.

All business communications, checks and money orders should be addressed to the

ARIZONA SCHOOL OF MINES,
WM. P. BLAKE, Director.

Tucson, Pima Co., Arizona.

ARIZONA SCHOOL OF MINES

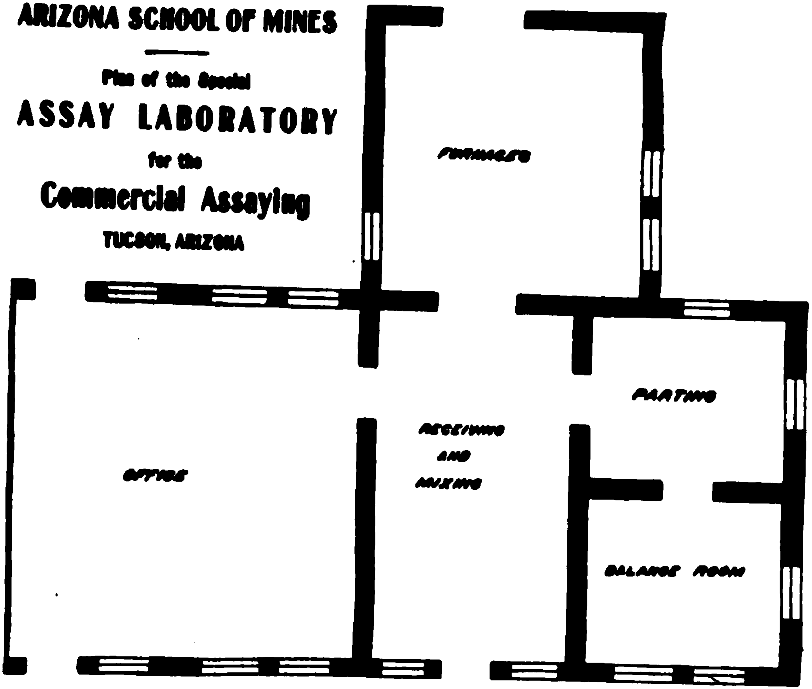
Plan of the Special

ASSAY LABORATORY

for the

Commercial Assaying

TUCSON, ARIZONA



THE AGRICULTURAL EXPERIMENT STATION

STATION STAFF

THE PRESIDENT OF THE UNIVERSITY
R. H. FORBES, M. S., - - - Director and Chemist
A. J. McCLATCHIE, A. M., - Agriculturist and Horticulturist
T. F. McCONNELL, - - - - Animal Husbandman
JOHN J. THORNBER, A. M., - - - - Botanist
W. W. SKINNER, M. S., - - - Associate Chemist
T. D. A. COCKERELL, - - Consulting Entomologist
S. M. WOODWARD, A. M., - - Consulting Meteorologist
W. O. HAYES, - - - - - - - - - Clerk

ORGANIZATION AND WORK

The Agricultural Experiment Station is a legally constituted department of the University, whose purpose is "to aid in acquiring and diffusing * * * useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and applications of agricultural science."

With the above objects in view, the organization of the Station includes the departments of administration, agriculture and horticulture, animal husbandry, botany and chemistry, the whole or a major portion of the time of one or more members of the Station staff being devoted to each department of the Station work. Provision is made for meteorological and entomological work also, though to a less degree.

Owing to the wide variation in agriculural conditions in Arizona, it has been found of advantage to distribute the work so that each department is located, so far as possible, in the situation most favorable to the accomplishment of its own special results. According to this principle, the various lines of Experiment Station work have been distributed as follows:

The Director's office and the departments of botany and chemistry are maintained at Tucson in the University buildings. Through this arrangement, the Experiment Station profits by the buildings and libraries of the University, while the University is benefited from time to time by the teaching ability of members of the Station staff. It has been found that from this base of operations the three great agricultural districts of the Territory—Salt River valley, the lower Colorado, and the upper Gila—are accessible with equal convenience for field work and observations.

On the same grounds—fitness of location for the work undertaken—the Experiment Station form has been maintained and strengthened at Phoenix. Salt River valley is intermediate in elevation, in situation, and in mean yearly temperature between the other two important farming districts above mentioned, and for this reason the agricultural and horticultural results obtained there are capable of the most general application in the Territory at large.

On the same principle again, the date palm orchard is located in the alkaline district south of Tempe, where a successful demonstration of this palm as a commercial fruit producer will be of the greatest value, creating use for great areas of alkaline land in the arid Southwest.

The range station also, for the study of worn-out range country with a view to its reclamation to usefulness, is located in a typical district near Tucson, and is conducted under the auspices of the department of botany, co-operating with the United States Department of Agriculture.

The services of specialists in various subjects, such as entomology, meteorology and soil survey work have also been secured from time to time.

The results of the Experiment Station work are made public at frequent intervals in the bulletins and reports of the Station. These publications are made in two series: first, the longer and more technical bulletins, stating in considerable detail the investigations as they mature, and secondly, the "Timely Hints for Farmers," which are brief writings issued at the time when they will be most useful, written in plain language, and presented in popular form. The annual reports also are for the most part written popularly, and afford a convenient and reliable summary of each year's work as it comes to completion.

The Experiment Station work conducted and published on the lines indicated above has a two-fold value. In the first place, the suggestions made or derived from the investigations of the Station are of direct material profit to the agricultural public and are intended to be immediately applied to advantage in the betterment of agricultural practice. In the second place, these writings are intended to serve an educational purpose, inasmuch as they are so presented as to constitute lesson sheets for the benefit of the careful reader. It may therefore be considered that the Experiment Station reaches a class of some thirty-five hundred readers in the Southwest at frequent intervals by means of its "Timely Hints" and other publications. The operations of the range study tract at Tucson, the Experiment Station farm at Phoenix, the date palm orchard at Tempe, and the sugar beet plots on the upper Gila serve also as an object lesson to the adjacent public.

It is believed that this distributed and mobile organization is especially effective, not only for the purposes of the Experiment Station, but also for those of the University as well, since it allows the Station to conduct its work in localities suitable for the accomplishment of results; and again, it causes the public to become better acquainted with the territorial University, of which the station is a department.

An appropriation of eleven thousand dollars, made for the use of the Station by the Twenty-second Legislature, recently adjourned, attests the estimation in which the work of the Station is held. This appropriation is intended for the improvement of the date orchard, for purchasing livestock and buildings for the farm, and for issuing publications and holding farmers' institutes and short courses of instruction throughout the Territory.

Provision, therefore, is made for the symmetrical development of this work in the Territory, both experimentally and educationally; and, prospectively, "the farmers' college" bids fair to increase in usefulness to the growing agricultural interests of the Territory.

ACKNOWLEDGMENTS

Thanks are due various publishers and individuals for a number of valuable books given to the library.

The museum has received during the past year many valuable specimens of rocks and minerals, and is especially indebted to Mr. Herbert Brown, of Yuma, for continued gifts of specimens in natural history, for rare Arizona fossils and remains of extinct animals.

Dr. B. B. Moeur of Tempe has offered a medal to be competed for annually in debate by students of the Tempe Normal School and of the University.

The University gratefully acknowledges the gift of $5,000 from Prof. James Douglas and his associates of the Copper Queen Consolidated Mining Company, to be applied toward the construction of a gymnasium. This gift was obtained through the efforts of ex-Chancellor Wm. Herring and in his honor the gymnasium will be called Herring Hall.

Thanks are due to the Twenty-second Legislature of Arizona for an appropriation of $1400 for the purchase of additional land, $5000 for completing and furnishing the new library and museum, $2000 for completing and furnishing the new gymnasium and $11,000 for the use of the Agricultural Experiment Station.

Through the liberality of Dr. H. W. Fenner and Hon. Rochester Ford, both former members of the Board of Regents, the University has received a complete X-ray apparatus with storage battery and all necessary accompaniments.

SUB-COLLEGIATE DEPARTMENT

INSTRUCTORS

FRANK YALE ADAMS, A. M., President.

SHERMAN MELVILLE WOODWARD, A. M., Geometry.

DAVID HULL HOLMES, B. S., Shopwork and Drawing.

GEORGE EDSON PHILIP SMITH, B. S., C. E., Physics.

JOHN JAMES THORNBER, A. M., Botany, Biology.

JOHN MERCER PATTON, A. M., French, German, Spanish.

HATTIE FERRIN, B. S., English, Latin.

MABEL GRAY HOOVER, Domestic Science.

MARION CUMMINGS STANLEY, B. A., Latin, English.

JOHN WILLIAM GORBY, B. A., Public Speaking.

ALICE OLIVIA BUTTERFIELD, B. A., Physical Culture, History.

BENJAMIN FRANKLIN STACEY, B. A., B. D., Science.

GEORGE MARK EVANS, LL. B., Mathematics.

ELBERT JOHN HOLLINGSHEAD, Bookkeeping, Civics, Commercial Law.

WILBUR OLIVER HAYES, Stenography, Typewriting.

GENERAL INFORMATION

In this department the University offers the work of a model High School, with the added advantages of shopwork and drawing and of domestic science.

Students of sufficient age who have finished the study possible to them in their home schools are enabled to continue their preparation for college, at the University, under the most favorable circumstances.

The equipment of the scientific laboratories is available for use in this sub-collegiate work, wherever it can be used advantageously, and makes possible strong work in elementary science. The instructors in this department are assisted by the professors of the college department, several of whom regularly conduct sub-collegiate classes. By reference to the course of study which follows, it will be seen that it offers a comprehensive training for those who may not be able to pursue their studies farther, while it gives a good preparation for college.

While the subjects are for convenience grouped by years in the following schedule, yet the departmental method will be followed. In the description of courses following, the subjects are arranged by groups or departments in the consecutive order in which they are taken up and students will be required to take them in this order. Aside from this sequence the ability of each student must determine what subjects are pursued at any given time, due regard being given to the proper balance of subjects. Parents are asked to remember that the teachers in this department have had long experience in both public school and collegiate work, and, while the wishes of parents will be followed as far as possible yet in the end the decision rests with the teacher. Individual attention will be given to the needs of each student.

To each student who completes the studies of this course, a certificate stating that fact will be given, which certificate will entitle the holder to admittance to the University courses of instruction without examination.

COURSE OF STUDY

The following course of study will be required of all students who fit themselves at the University for entrance to the Freshman class in 1904. Such variations from it will be made during the next year as will adapt it to the case of students already in the sub-collegiate department.

Military drill or physical culture is required of all able-bodied students throughout the course.

FIRST YEAR

English and English Reading	7	Phys. Geog. ½, Phys'l'gy ½.	5
Commercial Arithmetic.....	3	Drawing and Shopwork or Domestic Science.......	5
American History...........	2		

SECOND YEAR

English and English Reading	4	*Latin	5
Algebra	5	*Agriculture	5
*Bookkeeping	5	Drawing and Shopwork or Domestic Science......	5
General History	2		

THIRD YEAR

English and English Reading	5	*French	5
Plane Geometry	5	*Spanish	5
Civics	2	*German	5
Parliamentary Practice	1	*Stenography	5
*Biology½, Chemistry½	5	*Drawing and Shopwork or Domestic Science	5
*Latin	5		
*Greek	5		

FOURTH YEAR

English and English Reading	5	*Greek	4
Algebra½, Higher Arith.½	4	*Latin	4
Parliamentary Practice	1	*French	4
*Physics	5	*Spanish	4
		*German	4
		*English History	4

Numerals indicate number of recitations per week. Subjects marked * are elective. Two subjects from the electives must be chosen each year for at least three years.

MATHEMATICS

The course in arithmetic begins with percentage and includes a thorough review of the remainder of the subject. Special stress is laid on thoroughness and accuracy and a comprehension of the unity of the subject. Much time is given to the mental examples in order to develop accuracy and rapidity in all mental operations.

In algebra special attention is given to the transition from arithmetic to algebra, to the fundamental operations and especially to factoring. The course includes as much as is found in any good text-book of algebra through quadratic equations.

Plane geometry occupies one year. This is so taught as to develop orderly habits of thinking and of investigation. To that end much original work is required, including practical problems involving the application of the principles learned.

ENGLISH AND ENGLISH READING

The course in English embraces grammar, composition and rhetoric, besides a critical study of assigned classics. It begins with a systematic study of grammar. Throughout the whole course attention is paid to work in composition, the aim being to enable the student to express himself clearly, accurately and with ease. In rhetoric much attention is paid to the principles of style and expression. The Scott and Denney series of composition text-books is the guide for this work. The English classics studied in this department are those required for entrance to the University, as mentioned on page 23.

Under the general head of English reading the students are given drill in the elementary principles of reading and elocution. Much of the required work in preparatory English is done under this head.

The course in English reading aims to enable the pupil to comprehend the best thoughts of the best authors and to acquire a taste for good literature.

The work includes a thorough study of the elements of modulation, emphasis, and an elementary training of the voice. By far the greater part of the time is devoted to a somewhat careful study of selected classics.

The text-books in use during 1902-3 are those of the entrance requirements in English, page 23.

PUBLIC SPEAKING

A course of one year in laws of health, respiration, voice culture, articulation, orthoepy, physiology of the voice, cure of faults of voice and manner; gesture, rendition, emphasis, grace, deportment. Various styles of recitations committed to memory by each student for delivery before the class. Text-book, McIlvaine's Elocution.

HISTORY

The aim of all the work in history is to lead the pupil to see the development of races and nations along political, social and religious lines, and to arouse in him a love for the subject and a habit of broad and discriminate reading.

American history is reviewed during the first year. Montgomery is used as a text-book with Smyth's Topical Manual, but much collateral reading is required and the institutional side of the history is made prominent.

The work of the second year includes ancient, mediaeval and modern history. The aim is to give the student an idea of the essential unity of history and the leading facts in the political development of races and nations. Adams's European

History is used supplemented by the reading of references contained therein.

Fiske's Civil Government in the United States is the text-book in civics. The historical development of the subject is made prominent while practical problems, such as taxation and municipal government, are made the subjects of special investigation and study.

Coman and Kendall's or Larned's History of England is used as the text-book in the fourth year.

LATIN, GREEK, FRENCH, SPANISH AND GERMAN

For an outline of the courses in Latin and Greek see page 24, under requirements for admission.

For an outline of the courses in French, Spanish and German see pages 32, 33.

DRAWING AND SHOPWORK

This course in Manual Training is the preparatory course leading up to the College Mechanic Arts course described on pages 43, 44. The work consists of both drawing and shop work, between which subjects the student's time is about equally divided. The course covers three years and is designed to furnish a thorough elementary knowledge of Manual Training as taught in the sub-collegiate schools of the country.

FIRST YEAR. *Drawing*—Freehand; lettering; geometrical designs; historical ornament.

Shopwork—Wood carving; geometrical designs; historic ornament.

SECOND YEAR. *Drawing*—Instrumental; geometrical constructions; orthographic projections.

Shopwork—Joining and wood turning; cabinet work and wooden-ware.

THIRD YEAR. *Drawing*—Mechanical draughting; shop drawings; freehand drawing; freehand working sketches, and sketching from nature; lettering.

Shopwork—Forging, pattern-making, and moulding.

DOMESTIC SCIENCE

The course in domestic science is arranged to give instruction in the science and art of home economics, and to raise home making to a higher plane. It includes all branches of home science, hygiene, chemistry of cooking and cleaning, preparation of all food stuffs, both fancy and elementary.

Two courses are offered in sewing. The first year includes fancy needle work, and the second year drafting, cutting and dressmaking. The course includes laundering of laces and ribbons, nursing and food for the sick, marketing, management of servants. Social duties and customs of society are considered with particular care. The students have access in the domestic science library to all the best authorities.

MUSIC AND PAINTING

It is the purpose of the University to provide instruction in vocal and instrumental music and painting for students desiring to take these subjects in connection with their other work. As there is no fund for the payment of instructors in these subjects, a tuition fee of $25.00 per semester for each class will be charged. Further particulars will be given to those interested upon application.

BOOKKEEPING, STENOGRAPHY AND TYPEWRITING

Bookkeeping is taught by the modern budget system. The work is individual and each student may progress as fast as his time and ability permit. The course is thorough in all the details of office practice. The course includes instruction in commercial law. A complete course in stenography is offered, the Pitman system being used. The department is equipped with Remington typewriters.

PARLIAMENTARY PRACTICE AND DEBATE

The two higher classes in the sub-collegiate department devote one period of each week to work in parliamentary practice and debate. The classes are organized under a regular constitution and by-laws. Instruction is given in parliamentary law, Roberts's Rules of Order being used as a text-book. The members are required to introduce resolutions and prepare debates upon them. They are also given practice in performing the duties of secretary and in presiding in the meetings.

SCIENCE

It is the object of the course in science to initiate the student into the processes and methods used in laboratory work; to teach close observation, careful manipulation and logical deduction; to acquaint the student with the fundamental facts of the various branches of science and to give full practice in the use of good English in describing various observations and experiments.

An introductory laboratory course is given in the first year. The third year is given half to biology and half to chemistry. These courses are offered to prepare students for Botany 1, 2; Zo-ology 1, 2 and Chemistry 1, 2, and consist almost entirely of laboratory work. During the fourth year a rigid course is given in physics, fully covering college preparatory physics with ample experimental work. Abundant apparatus and laboratory facilities are supplied for all these courses.

AGRICULTURE

It is not intended here to anticipate the work prescribed in the regular college course in agriculture but rather to present certain practical, elementary phases of the subject found to be of especial value in this region. The course will deal with many of the varied problems which confront the Arizona farmer and will be of exceptional benefit to those who have spent some time on an Arizona farm and are accordingly acquainted with existing agricultural methods. The "Timely Hints" published by the Experiment Station will be closely followed when applicable, the bulletins of the various stations carefully examined as the subjects may demand and the student will be encouraged to preserve for future use valuable references in the way of bulletins and other agricultural works.

Such subjects as the following will be discussed and to the extent possible, illustrated by means of experiments:

Weeds, their means of propagation and dissemination, their frequence and abundance, with methods of eradication. Life-history of fungi causing common plant diseases with methods of control. Treatment of insect pests. Collection, preservation and germination of seeds of economic trees and shrubs, with proper methods of tree planting and proper trees to plant for forest, fruit or ornament. Irrigation of gardens and fields; things that must be known before successful irrigation is possible. Practicability of constructing dams to hold storm water for agricultural and grazing purposes. Forage plants of the Territory, including grasses, salt bushes and other plants, their reproduction and conservation; study of these plants from the Experiment Station grass garden. Range reclamation and restoration; study of Experiment Station range reserve. Soils, treatment of, also adaptability to various plants.

MILITARY ORGANIZATION 1902-03

Commandant of Cadets	**Major J. M. Patton, N. G. A.**

STAFF

Adjutant	**Capt. Walter E. Hadsell**
Sergeant Major	**Bard L. Cosgrove**
Color Sergeant	**Zebulon Pearce**
Chief Trumpeter	**Benito G. Suarez**
Trumpeter	**Elwood R. Wager**

COMPANY "A"

Captain	**Edward S. Stafford**
First Lieutenant	**Kirke T. Moore**
Second Lieutenant	**Roy W. Moore**
First Sergeant	**Oliver Scow**
Sergeant	**Sheldon Ijams**
Sergeant	**Roy B. Kilgore**
Sergeant	**J. Wesley Gebb**
Corporal	**Sylvan C. Gans**
Corporal	**Dean W. Andrews**
Corporal	**Chas. T. Mullen**

COMPANY "B"

Captain	**Courtland F. Day**
First Lieutenant	**Wm. D. Whipple**
Second Lieutenant	**Thos. K. Marshall**
First Sergeant	**Fred H. Bernard**
Sergeant	**Monte Mansfield**
Sergeant	**Francis D. Crable**
Corporal	**Owen Jones**
Corporal	**Leo Rosenberg**
Corporal	**Albert A. Johns**

BAND

Leader, Bb Clarionet	**William K. Seitz**
Eb Cornet	**Arthur Ferrin**
Solo Bb Cornet	**Benito G. Suarez**
First Bb Cornet	**L. F. Hazzard**
Second Bb Cornet	**C. E. Thomas**
First Trombone	**F. H. Bernard**
Second Trombone	**W. B. Alexander**
First Eb Alto	**A. A. Trippell**
Second Eb Alto	**C. L. Green**
Eb Bass	**F. C. Kelton**
Snare Drum	**W. A. Grosetta**
Bass Drum	**H. Clay Parker**

ALUMNI ASSOCIATION

The Alumni Association of the University of Arizona was organized on the second day of June, 1897.

The object of this society as expressed in its constitution is: "To promote the interests of the University, to secure unity among its graduates and to foster an attachment to our Alma Mater."

Concerning the last two clauses of this declaration it may be said that the organization is carrying out their meaning in a manner which leaves little if anything to be desired. There is no doubt regarding the loyalty of the graduates to the University of Arizona and no question of their unanimous desire for the prosperity of the institution.

The first clause of the above declaration, however, deals with a matter which in a sense admits of more growth than those just mentioned and the members of the association realize that there is room for further progress in the accomplishment of this purpose.

In the past the alumni organization has been small in numbers and efforts "to promote the interests of the University" have necessarily been somewhat feeble. As, however, the membership is now fairly large and will be considerably augmented in 1903 it is the conviction of the alumni that the time has come for more clearly defined and decisive work in behalf of our Alma Mater.

So far the activity of the society has been shown in two ways: First by assuming charge of the work of securing suitably framed photographs of the members of the graduating classes, from year to year, and presenting these to the University for preservation on its walls, thus forming a pictorial record of the work of the institution. Secondly by giving an annual banquet at Commencement to the graduates and members of the faculty, thereby creating a fraternal feeling between the old and new members of the association and also keeping the instructors and graduates in touch with each other from year to year. However commendable and important these enterprises may be it is the belief of the society that now with numerous members scattered throughout Arizona actively engaged in the industries, arts and sciences the time has come to take up additional work.

The members of the association realize that there are yet many people in the Territory who are not fully aware of the educational opportunities afforded by the University. Some of these are sending their children to other States to receive an education which might be obtained equally well in this Territory. It should be realized that the more the people patronize their own institution the better will become the courses which it can offer. In one sense the degree of development of the University depends only on the measure of support given to it by the citizens of the Territory.

Another feature which is commended to the careful consideration of our wealthy citizens is that the University of Arizona has not one cent of endowment. Through the generosity of one of the largest mining companies in Arizona the institution has received two substantial gifts of money to aid in the erection and furnishing of buildings, but other than this nothing has been received from private individuals. Institutions to the east and west of us have endowments of thousands of dollars; why should not thé University of Arizona be endowed also?

In pursuance of the foregoing lines of thought it will be the aim of the alumni association to endeavor to create a deeper feeling of interest and pride in the University of Arizona among the people of the Territory.

ALUMNI OF UNIVERSITY OF ARIZONA

1895

Charles Oma Rouse, B. S., Night Agent Southern Pacific Railroad Company, Tucson, Arizona.

Mercedes Anna Shibell, B. S., (Mrs. M. A. Green) Deputy Recorder of Pima County, Tucson, Arizona.

Mary Flint Walker, B. S., (Mrs. Pearl Adams) Benson, Arizona.

1897

Edward Marshall Boggs, C. E., *(nunc pro tunc)* Chief Engineer Oakland Electric Railways, Oakland, Cal.

Clara Cramond Fish, B. S., Teacher, Tucson, Arizona.

George Ojeda Hilzinger, B. S., Teller in Bank, El Paso, Tex.

Mark Walker, B. S., Metallurgist, Tucson, Arizona.

1898

Hattie Ferrin, B. S., Instructor in University of Arizona, Tucson, Arizona.

Granville Malcolm Gillett, B. S., Draughtsman in Surveyor General's Office, Phoenix, Arizona.

Minnie Watts, B. S., (Mrs. W. B. Smith) Altaville, Cal.

*John Desha Young, B. S., Assayer, Elkhart Mining Company, Chloride, Arizona.

1899

Robert L. Morton, B. S., Assayer, Yuma, Arizona.

1900

Ida Clarissa Flood, B. S., Teacher, Tucson, Arizona.

Samuel Pressly McCrea, B. S., A. B., Principal of High School, Mountain View, California.

Charles Pierce Richmond, B. S., Cyanide Manager, San Salvador, Central America.

Florence Russel Welles, B. S., Teacher, Tucson, Arizona.

1901

Rudolph Casteneda, B. S., Surveyor, Benson, Arizona.

Clara Ferrin, B. S., Teacher, Tucson, Arizona.

George Millard Parker, B. S., Student, University of California, Berkeley, California.

David Hull Holmes, B. S., *(nunc pro tunc)* Professor of Mechanic Arts and Drawing, University of Arizona, Tucson, Arizona.

1902

Andrew Gilbert Aiken, A. B., B. S., Surveyor, Canton, New York.

Moses Blumenkranz, B. S., Asst. Supt. Shannon Copper Company, Metcalf, Arizona.

Ruth Brown, Ph. B., Teacher, Tucson, Arizona.

Felix Grundy Haynes, B. S., Casa Grande, Arizona.

Rosa Belle Parrott, Ph. B., Teacher, Roseburg, Oregon.

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*Died April 8, 1899.

Philip Matthew Reilly, B. S., Assayer, La Cananea, Sonora, Mexico.

Bertram L. Smith, B. S., Surveyor and Assayer, Mayer, Arizona.

Bessie Smith, Ph. B., Teacher, Tucson, Arizona.

Walter James Wakefield, Assayer, Tombstone, Arizona.

DEGREES CONFERRED

1902

BACHELOR OF PHILOSOPHY

Ruth Brown.
Rosa Belle Parrott.
Bessie Smith.

BACHELOR OF SCIENCE

Andrew Gilbert Aiken.
Moses Blumenkranz.
Felix Grundy Haynes.
Philip Matthew Reilly.
Bertram Louis Smith.
Walter James Wakefield.

REGISTER OF STUDENTS

1902-03

POST GRADUATE STUDENTS

Gorby, John Wm. (B. A. Marietta College) Philosophy and Education	Marietta, Ohio
Stacey, Benjamin Franklin, (B. A. Lombard University) Economics and Education	Chicago, Illinois
Fish, Clara Cramond, (B. S. University of Arizona) Spanish	Tucson
Rogers, Mrs. Anna E., (B. A. Centenary College) English	Tucson

SENIORS

Drane, Richard Lamar	Mesa
Evans, George Mark	Tucson
Gillett, Leslie Alex	Phoenix
Holmesley, Georgia Ann	Tempe
Johnston, Robert Eames	Grand Haven, Michigan
Jones, Edward Horton	Tucson
Prout, John Willard, Jr	Denver, Colorado
Steele, Thomas Edward	Willcox

JUNIORS

Alexander, William Burnham	Scituate, Massachusetts
Guild, Marilla Merriman	Tucson
Hollingshead, Elbert John	Tucson
Kelton, Frank Caleb	St. Albans, Vermont
Mead, Roy Gibbons	Tucson
Prout, Estelle Markham	Denver, Colorado
Seitz, William Kerlin	Lancaster, Missouri
Tompkins, Ethel	Tucson

SOPHOMORES

Ball, Charles Leonard	Santa Monica, California
Calderwood, Martin Harrison	Phoenix
Chapin, Theodore	Los Angeles, California
Day, Courtland Francis	Duncan
Ganz, Sylvan Cleveland	Phoenix
Gebb, John Wesley	Jerome
Jacobson, Robert Clark	St. Paul, Minnesota

Katzenstein, Alma Fanny	Tucson
Marshall, Thomas K	Garnett, Kansas
Norway, Ora Elinor	Tucson
Pearce, Zebulon	Mesa City
Rosenberg, Leo M	Phoenix
Whipple, William Dominicus	Clifton
Wooddell, Minnie Louise	Tucson

FRESHMEN

Brown, Thomas Bruen	Los Angeles, California
Byrd, Carlisle Oliver	Parsons, New Mexico
Byrd, Olga Evelyn	Parsons, New Mexico
Bernard, Frederick Horton	Tucson
Colton, Georgiana	Florence
Dickinson, William Wallace, Jr	Little Rock, Arkansas
Fish, Florence	Tucson
Foster, Hugh M	Freeport, Kansas
Hodgdon, Mary Blanche	Deming, New Mexico
Ijams, Sheldon	Safford
Kilgore, Roy Bartley	Williams
Mead, Minnie Jean	Tucson
Metcalfe, Robert Bela	Lexington, Kentucky
Millington, Hugh S	Tucson
Moore, Kirke Tonner	Tucson
Moore, Nino	Tucson
Moore, Roy Webb	Tucson
Nave, Elise Wheaton	Tucson
Olney, Claborn Clanton	Safford
Olwell, Margaret	Central Point, Oregon
Paterson, Frances	Tucson
Scow, Oliver	Dos Cabezas
Stafford, Edward Satterlie	Safford
Snyder, Mary Frances	Bellville, Illinois

UNCLASSIFIED

Bronson, George Gordon (Assaying)	Tucson
Bostrom, William Walter (Assaying)	Grafton, North Dakota
Barrett, Vanette (English)	Tucson
Castle, Margaret (Spanish)	Minneapolis, Minnesota
Cosgrove, Bard L. (Surveying and Chemistry)	Chicago, Illinois
Drumiler, Elbert Perl (Spanish)	Tucson

Fitch, Frank (Engineering)	**Denver, Colorado**
Guild, Mabel Aenella (Botany)	**Tucson**
Goodin, Francis Earle (English)	**Tucson**
Hadsell, Walter Elias (Assaying)	**Buckeye**
Huntsman, Mrs. Joel (Spanish)	**Bristol, Tennessee**
Mullen, George Hiram (Surveying)	**St. Clair, Pennsylvania**
Parker, Henry Clay (Assaying)	**Phoenix**
Petticrew, Minnie (English)	**Tucson**
Stanley, Bruce Macy (Economics and English)	**Tucson**
Towner, Nora (English)	**Tucson**
Thornber, Harriet Brown (Botany and French)	**Tucson**
Whitcomb, Edith H. (Latin)	**Chicago, Illinois**

SUB-COLLEGIATE—FOURTH

Andrews, Dean Webber	**Tucson**
Bayless, Zebulon Vance	**Oracle**
Bernard, Noah Curry	**Tucson**
Bonillas, Ygnacio Safford	**Nogales**
Brown, Harriet Estella	**Tucson**
Brown, James Kilroy	**Tucson**
Crable, Francis Drake	**Tombstone**
Davis, Hattie Louise	**Fairbanks**
Feldman, Mabel	**Tucson**
Ferrin, Arthur Harry	**Tucson**
Fitch, Constance	**Tucson**
Gebb, William Stanley	**Jerome**
Hill, Walter Harrison	**Hamilton, Canada**
Hodnett, William Edward	**Lincoln, Illinois**
Jones, Ernest	**Tucson**
Lane, Edward Sawyer	**Mystic, Connecticut**
Mabee, Virginia Alice	**Douglas**
Nelson, Ada M	**Tucson**
Page, Alfons Clide	**Tucson**
Pickett, Earnest Charles	**Calistoga, California**
Purcell, Weda Ina	**Tucson**
Redd, Paul Chester	**Tucson**
Robinson, Margaret Louise	**Safford**
Samuels, Kathryn	**Tucson**
Schneider, Gustav Van Hemert	**Tucson**
Spinas, Nellie	**Florence**
Thomas, Harry Bryson	**Tucson**

Winchester, Robert Schwor	Tucson
Wooddell, Charles Edward	Tucson
Wood, Leslie Margaret	Bonita
Wolfin, Hugh Maupin	Tucson
Zellweger, Elsie Marie	Tucson
Zellweger, John Henry	Tucson

SUB-COLLEGIATE—SECOND

Bell, Helen	Tucson
Brown, Clara Agnes	Tucson
Brown, John Stephenson	Tucson
Buehman, Albert Rex	Tucson
Cole, Rena Ann	Tucson
Culley, Edith E.	Tucson
Drew, Willie F.	Mesa
Estabrook, Pearl	Tucson
Fulton, Alma Riggs	Tucson
Francis, Mae Agnes	Tucson
Gallen, George Cleveland	Tombstone
Gamble, Josie	Solomonville
Gamble, James A.	Solomonville
Gamble, William Edward	Solomonville
Green, Luther Clarence	Solomonville
Guerry, Horace Dixon	Tucson
Hoopes, John Lawrence	Thatcher
Johns, Albert Arthur	Prescott
Johnson, Joel Elmer	Mesa
Jones, Owen Frank	Buckeye
Kohler, Bernalilla Celia	Tucson
Kohler, George William	Tucson
McNelly, Benjamin Arthur	Globe
Mansfeld, Monte	Tucson
Menager, Lucy L.	Tucson
Mullan, Charles Thomas	Jerome
Parks, Harry Oscar	Willcox
Pease, Ione Gertrude	Tucson
Pew, William James	Mesa
Poage, Judith	Ashland, Kentucky
Pusch, George W.	Tucson
Pusch, Gertrude	Tucson
Straight, Blanche	Tucson

Stephens, William Richard	Metcalf
Stewart, Jesse H.	Mesa
Stratton, Elmer Willis	Tucson
Suarez, Benito Guadalupe	Solomonville
Thomas, Charles Emerson	Tucson
Wager, Elwood Roy	McCabe

SUB-COLLEGIATE—FIRST

Bamrick, Joseph Richard	Florence
Bartlett, Lulu Mae	Tucson
Beach, Bessie Nell	Tucson
Brown, Charles O. Jr	Tucson
Carpenter, Lessie Lucile	Tucson
Copeland, Stratton Sam	Phoenix
Davis, E. Earl	Tucson
Detloff, Albert John	Bisbee
Drumiler, Chester	Tucson
Evans, Evelyn Mayme	Tucson
Flynn, John Rossi	Tucson
Grosetta, Warren Arthur	Tucson
Halderman, Ada	Dragoon
Hazzard, Lynn Franklin	Tucson
Lindsay, Winston Dillon	Tucson
Lobaton, Juan Viaesca y	San Pedro, Mexico
Martin, Andrew P.	Tucson
McNeil, Arthur J.	Tucson
Pease, Allen Ralph	Tucson
Rebeil, Bernardo	Tucson
Redd, Wardron Russell	Tucson
Reed, Sheldon Alanson	Tucson
Riggs, Charles P.	Willcox
Rodgers, Pauline	Tucson
Rouzer, Leslie Wallace	Bisbee
Rose, Frederick Edward	Fort Thomas
Rose, Bert Edward	Fort Thomas
Samuels, Agnes Huntington	Tucson
Scholefield, Helen Mar	Tucson
Sligh, George Alexander	Nogal, New Mexico
Steele, Henry Earl	Willcox
Steinfelt, Harold	Tucson
Tonkin, Ruth Anna	Tucson

Trippel, Alfred Alexander	Tucson
Whalley, Mabel Elizabeth	Tucson
Winchester, Wilber Theodore	Tucson

UNCLASSIFIED

Ackerman, Anna (English)	St. Louis, Missouri
Bartlett, Allie A. (English)	Tucson
Beard, Anna (Stenography and Bookkeeping)	Tucson
Cheyney, Berenice (Stenography)	Tucson
Cheyney, Frances (Stenography)	Tucson
Colquhoun, Elizabeth (Stenography)	Clachan, Ontario
DeForrest, Alice Louise (Latin, Algebra, Spanish)	Tucson
Gung'l, John Carl (Stenography)	Tucson
Gung'l, Margaret Josephine (Stenography)	Tucson
Ochoa, Mrs. Gertrude (Bookkeeping)	Tucson
Olwell, Julia (Oratory and Spanish)	Central Point, Oregon
Perry, Mary (Stenography)	Tucson
Pruett, Mrs. Edna (Bookkeeping)	Tucson
Soldini, Constance Rosalie (Stenography)	Tucson

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Register
of the
University of Arizona

Thirteenth Year
1903-1904

Announcements
1904-1905

Tucson, Arizona
MDCCCCIV

REGISTER

OF THE

UNIVERSITY OF ARIZONA

THIRTEENTH YEAR

1903-1904

ANNOUNCEMENTS

1904-1905

TUCSON, ARIZONA
THE CITIZEN PRINTING AND PUBLISHING COMPANY
1904

CALENDAR

1904

Sept. 15, Thursday	Entrance Examinations.
Sept. 16, Friday	
Sept. 19, Monday	Registration Day.
Sept. 20, Tuesday	First Semester begins.
Nov. 23, Wednesday	Thanksgiving Recess begins.
Nov. 28, Monday	Instruction resumed.
Dec. 23, Friday	Holiday Recess begins.

1905

Jan. 3, Tuesday	Instruction resumed.
Feb. 2, Thursday	First Semester ends.
Feb. 3, Friday	Arbor Day; celebrated also as the Anniversary of the University.
Feb. 6, Monday	Second Semester begins.
May 28, Sunday	Baccalaureate Discourse.
May 29, Monday	Exhibition Military Dept.
May 31, Wednesday	Exhibition Mechanic Arts Dept.
June 1, Thursday	Commencement.

BOARD OF REGENTS

EX-OFFICIO

HON. ALEXANDER O. BRODIE .... Phoenix

Governor of the Territory

HON. N. G. LAYTON .... Phoenix

Superintendent of Public Instruction

APPOINTED BY THE GOVERNOR

HON. WINFIELD SCOTT, A. B., D. D. (Chaplain, U. S. A., retired) .... Scottsdale

Chancellor

HON. GEORGE J. ROSKRUGE .... Tucson

Secretary

HON. JOHN M. ORMSBY .... Tucson

Treasurer

HON. MARK J. EGAN .... Clifton

FACULTY

KENDRIC CHARLES BABCOCK, Ph. D.

B. L., 1889, Minnesota; A. M., 1895, Harvard; Ph. D., 1896, Harvard.

*President, Professor of History. 1903**.

WILLIAM PHIPPS BLAKE, A. M.

Ph. B., 1852, Yale; A. M., Dartmouth.

Professor of Geology, Metallurgy and Mining; Director School of Mines. 1895.

HOWARD JUDSON HALL, A. M.

B. S., 1890, Michigan (Agricultural); A. B., 1896, Stanford; A. M., 1900, Harvard.

Professor of English; Librarian; Dean of the Faculty. 1891.

ROBERT HUMPHREY FORBES, M. S.,

B. S., 1892, M S., 1895, University of Illinois.

Director and Chemist Agricultural Experiment Station. 1894.

SHERMAN MELVILLE WOODWARD, M. S., A. M.

M S., 1893, Washington University; A. M., 1896, Harvard.

Professor of Mathematics and Mechanics; Meteorologist Agricultural Experiment Station. 1896.

FRANK NELSON GUILD, M. S.

B. S., 1894, M. S., 1903, Vermont.

Professor of Chemistry and Mineralogy. 1897.

ALFRED JAMES McCLATCHIE, A. M.

A. B., Nebraska; A. M., Olivet.

Professor of Agriculture and Horticulture, Agricultural Experiment Station. (Residence, Phoenix.) 1898.

DAVID HULL HOLMES, B. S.

1892-1894, Washington University: B. S., as of 1901, Arizona.

Professor of Mechanic Arts and Drawing; Secretary of the Faculty. 1898

WILLIAM W. SKINNER, M. S.

B. S., 1895. Maryland (Agricultural). M. S., 1897, Columbian.

Associate Chemist Agricultural Experiment Station; Instructor in Photography.† *1899.*

GEORGE EDSON PHILIP SMITH, C. E.

B. S., 1897; C. E., 1898, Vermont.

Professor of Physics and Engineering. 1900.

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* The dates following titles indicate appointment to service in the University.

† Associate Professor (elect) of Chemistry.

JOHN JAMES THORNBER, A. M.

B. S., South Dakota (Agricultural); B. S., 1897, A. M., 1901, Nebraska.

Professor of Biology; Botanist, Agricultural Experiment Station. 1901.

THOMAS FRANKLIN McCONNELL,

Professor of Animal Husbandry, Agricultural Experiment Station. (Residence, Phoenix.)

FAUST CHARLES GEORGE DeWALSH, A. B.

A. B., 1903, Rochester.

Professor of Modern Languages. 1903.

MASON M. MAXON, Captain, U. S. A.

1868, West Point.

Professor of Military Science and Tactics. 1903.

IVAN DeLASHMUTT, B. S.

B. S., 1901, California.

*Professor of Metallurgy. 1904.**

MABEL GRAY HOOVER,

Graduate Oread School of Domestic Science.

Instructor in Domestic Science. 1901.

HATTIE FERRIN, B. S.

B. S., 1898, Arizona.

Instructor in English and Latin. 1901.

ELBERT JOHN HOLLINGSHEAD,

Instructor in Bookkeeping and Civics. 1902.

MARION CUMMINGS STANLEY, B. L.

B. L., 1900, California.

Instructor in Latin and English. 1902.

GEORGE MARK EVANS, LL. B.

LL. B., 1894, Michigan; Ph. B., 1903, Arizona.

Instructor in Mathematics. 1902.

JOHN WILLIAM GORBY, A. M.

A. B., 1901, Marietta; A. M., 1903, Arizona.

Instructor in Public Speaking. 1902.

ALICE OLIVIA BUTTERFIELD, A. B.

A. B., 1901, Stanford.

Instructor in History and Physical Culture; Assistant Librarian. 1902.

BENJAMIN FRANKLIN STACEY, A. B., B. D.

A. B., 1896, B. D., 1898, Lombard; A. M., 1903, Arizona.†

Instructor in Science and Philosophy. 1902.

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* Absent on leave until September, 1904.

JOHN WILLIAM PROUT, JR., B. S.
B. S., 1903, Arizona.
Assistant in Chemistry. 1903.

ANNA BEARD,
Instructor in Stenography and Typewriting. 1903.

O. A. KATES
Acting Director of Physical Training. 1904.

OTHER OFFICERS

HERBERT BROWN
Curator Territorial Museum.

JAMES STEPHEN MANN, B. S.
Commercial Assayer. 1902.

GEORGE G. HOOLE
Secretary to the President.

MRS. CORDELIA M. STEWART
Matron in Charge of North Hall.

EDWARD BANNISTER
Superintendent of Buildings and Machinery. 1903 (Dec.).

CHAS. E. CHASE
Engineer.

STUDENT ASSISTANTS

ERNEST JONES
ARCHIE MOORE
FRANK C. KELTON
WILLIAM E. GAMBLE
WILLIAM B. BROSTROM
BENITO G. SUAREZ
WILLIAM D. WHIPPLE
WM. B. ALEXANDER
ROY MORFOOT
ARNOLD SCHMID
CHARLES ALEXANDER
HATTIE L. DAVIS
ROY L. CORNELL

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† Connection with the University severed April, 1904.

STANDING COMMITTEES OF THE FACULTY

1903-4

The President is ex-officio member of all committees.

EXECUTIVE

Profs. Blake, Forbes, Woodward, Smith.

REGISTRATION AND CLASSIFICATION

Profs. Woodward, Hall, Guild, Smith

DISCIPLINE

Profs. Smitn, Skinner, Hall.

LIBRARY

Profs. Hall, Guild, Smith, Miss Butterfield.

PRINTING AND PUBLICATION

Profs. Hall, Woodward, Skinner.

ATHLETICS

Profs. Smith, Skinner, Thornber, Mr. Stacey.

PUBLIC EXERCISES

Mr. Gorby, Miss Ferrin, Mrs. Stanley.

INTERCOLLEGIATE DEBATE

Profs. Hall, Woodward, Thornber, Mr. Gorby.

MANUAL TRAINING

Profs. Holmes, Smith, Miss Hoover.

CO-OPERATIVE ASSOCIATION

Profs. Woodward, Holmes, DeWalsh, Miss Ferr

PRIZES

Profs. Guild, Thornber, Miss Butterfield.

SUB-COLLEGIATE DEPARTMENT

Profs. Woodward, Hall, Mrs. Stanley.

UNIVERSITY OF ARIZONA

Established by act of the Legislative Assembly, 1885; opened to students October, 1891

DESIGN

The purpose of the University of Arizona is, in the language of the organic law, "to provide the inhabitants of this Territory with the means of acquiring a thorough knowledge of the various branches of literature, science and the arts;" and so far as possible a technical education adapted to the development of the peculiar resources of Arizona. In furtherance of this latter purpose, instruction is especially provided in agriculture, the mechanic arts, and in mining and metallurgy. The Agricultural Experiment Station, a department of the University, is wholly engaged in investigating and developing the agricultural resources of the Territory. The institution aims to fill in the Territory the place occupied in the States by the State Universities. The undeveloped condition of secondary education in the Territory, and the desire to make the University serviceable to all, have led to the establishment and maintenance of a Sub-Collegiate Department.

GOVERNING BOARD

The government of the University is vested in a corporation styled The Board of Regents of the University of Arizona, consisting of the Governor of the Territory and the Superintendent of Public Instruction, ex-officio, and four other members appointed by the Governor.

LOCATION AND CLIMATE

The University of Arizona is located at Tucson, one of the largest towns in the Territory, on the main line of the Southern Pacific railway, 312 miles west of El Paso, Texas, and 500 miles east of Los Angeles, Cal. The town lies in a broad, flat valley at an elevation of 2,400 feet above sea level and is surrounded by mountains. Its dry, healthful situation with its mild and equable climate has made Tucson a famous winter resort.

The winter climate is especially good; the temperature is cool and strengthening but not severe, the lowest temperature recorded during the average year being about twenty degrees above zero, Fahrenheit. Little rain falls during the winter; fogs are unknown; cloudy days are rare. The percentage of sunshine throughout the winter is greater than that recorded at any other place in the United States. Owing to the extreme dryness of the air the highest temperatures known are less oppressive to the senses and less dangerous to the health than the summer heat of the upper Mississippi Valley States. The total amount of rainfall averages less than twelve inches.

SITE

The University is situated upon high ground about a mile from the business center of the city with which it is connected by a street-car line. On every side it commands a view of mountain scenery of remarkable extent and grandeur. The location cannot be surpassed for healthfulness. The water supply of the University is drawn from a well on the campus 120 feet deep and is of unusually good quality.

BUILDINGS

The main building, University Hall, is 200x105 feet, two stories in height, the first story of gray stone, the second of red brick, and is completely surrounded by a wide two-story veranda. The building contains the administrative offices, recitation rooms, laboratories and apparatus rooms of various departments, the libraries of the University and Experiment Station, and the Territorial Museum.

North Hall, a dormitory two stories in height built of gray stone of fine quality, originally provided as a home for male students, is now occupied by the young women. Besides the parlor and the rooms of the matron, it contains sixteen rooms, each large enough to accommodate two students. The building was renovated in 1903, a large and handsome parlor being fitted up and furnished by the University.

South Hall, a brick dormitory containing forty rooms, with bath and toilet rooms, is for the use of male students and instructors. The discipline of this dormitory is in charge of the Commandant of Cadets.

A new Dining Hall with kitchen, 40x104 feet in size, provides ample accommodations for all persons living in the dormitories.

A Library and Museum building to cost $26,000, exclusive of furnishing, provided by the Twenty-first Legislative Assembly, has been in course of erection during the current year. The contract calls for completion of the building in September, 1904. Five thousand dollars was appropriated by the last Legislative Assembly for furnishings.

The Gymnasium, given the University by Professor James Douglas and his associates, of the Copper Queen Consolidated Mining company, is now completed. With the $2,000 appropriated by the Legislative Assembly for equipment, a large quantity of first class gymnasium apparatus has been purchased and installed. Shower baths with necessary plumbing, and about one hundred lockers have put the Gymnasium in excellent shape for steady use.

The Shop and Assay building is a large substantial brick structure. It contains a commodious drawing room for mechanical and freehand drawing, a large forge, machine and carpentry laboratory, in which are placed 24 forges, 4 lathes, drills, besides engine and locker rooms. The commercial assaying department occupies a suite of rooms fully equipped with a large melting furnace, the necessary muffle furnaces, and other accessories for making complete and accurate assays.

The Mill building is located on the tract of land at the northeast of the campus, acquired by the University with the $1,400 appropriated for that purpose by the last Legislative Assembly. The building with machinery formerly constituting the annex to University Hall, was removed in the fall of 1903 to the new site.

Three brick houses two stories in height are occupied as homes by the president and professors

Other buildings are the boiler-house, which also contains the well and pumps whereby the water supply for irrigation and general purposes is obtained; a green-house, 80x21 feet; two propagating-houses; the cottage occupied by the classes in domestic science; and a temporary wooden building used for various purposes.

EQUIPMENT

LIBRARY

The Library, containing 8,100 bound volumes and 11,000 pamphlets, is open to the use of all students. A valuable feature of the library is the collection of complete sets of scientific and literary periodicals, which are of special service in research work.

The reading-room is furnished with about seventy scientific, literary and general periodicals, besides the weekly Territorial newspapers.

The Carnegie Library of the city of Tucson is also open to the use of the students of the University.

MUSEUM

The Seventeenth Legislative Assembly of Arizona passed an act establishing a general museum at the University. The object of the museum is to collect materials of all kinds illustrating the resources and development of Arizona, and particularly to preserve historical relics, including those pertaining to the aboriginal inhabitants.

Donations of specimens and collections will be received and gratefully acknowledged, but no special provision has yet been made by the Territory for the support of this department aside from a small appropriation for the salary of a curator.

The collections now displayed at the University comprise representative series of minerals, ores and rocks of Arizona. Among these may be particularly mentioned superb specimens from the mines of the Copper Queen at Bisbee. There are also collections of typical rocks and minerals for comparison, and many specimens of ores from different parts of the United States and from abroad. Great numbers of valuable specimens are now stored in trays preparatory to classification and distribution in cases. It is desired to make the collection of ores and minerals fully represent the great mineral resources of Arizona.

The museum in indebted to Mr. Herbert Brown, curator, for a large and valuable collection of skins of the birds of Arizona, which he has deposited in the museum, as well as for a collection of ancient aboriginal pottery and other relics. The fossil skull and teeth of an elephant and other fragmentary remains of extinct animals sent from Yuma by Mr. Brown also deserve special mention.

Historical records of much value are gradually accumulating as a part of this museum, and an appeal is made to old settlers and others to bear this fact in mind when making disposition of articles bearing even remote relation to the early pioneers and their history.

The professors at the University have the immediate care of the collections pertaining to their respective departments.

BIOLOGY

The biological laboratories are located in that portion of University Hall formerly occupied by the museum. The laboratories are convenient and well-lighted and the equipment is such as is required for modern instruction and research in the biological sciences. The library and apparatus are well selected and adapted to the region and the courses offered.

The collections possessed by this department form a very important part of its equipment. The herbarium consists of 12,000 sheets of mounted plants of which number 2,500 are included in the University botanical survey herbarium. The unique flora and fauna of the mountain, mesa and lowland collecting grounds in close proximity to the institution offer very attractive opportunities for instruction and research, especially along ecological lines. The Desert Botanical Laboratory of the

Carnegie Institution supplements in most admirable fashion the facilities of the University for investigation.

In addition to the above there are fifty cases of insects, a large case of seeds, articulate and disarticulate human skeletons, plaster and papier-mache models of the important structures of the human anatomy, and duplicate material for study and dissection.

CHEMISTRY

The chemical laboratories are two in number. That used for beginners in the study of general chemistry and qualitative analysis is on the second floor of University Hall and is equipped for the experimental and theoretical study of chemical science.

The laboratory for qualitative analysis is on the first floor of University Hall. It is provided with analytical and bullion balances of the latest model and is equipped for the teaching of volumetric and gasometric analysis, blow-pipe analysis, metallurgical chemistry, and wet and fire assaying, including apparatus for the electrolytic determination of metals. A portion of the room formerly used as an assembly hall has been fitted up as a balance room.

The chemical apparatus and collections are adequate and the equipment is good, but the increase in the number of students has overcrowded the laboratories.

The laboratory of the Experiment Station occupies three rooms on the first floor, being devoted to analytical work and chemical investigations relating to agriculture. Though not intended for the use of students, it is of incidental value to the institution through the investigations which are here conducted.

MINERALOGY

The laboratory for quantitative analysis is used for determinative mineralogy and blow-pipe analysis. The laboratory is supplied with necessary apparatus for student work including glass and wood models for the study of crystallography, hand and reflecting goniometers for the measurement of the angles of crystals, and a polariscope for the study of the optical properties of minerals, and a type set of 600 minerals.

PHYSICS

Three rooms on the first floor are set apart for the teaching of physics. The facilities for experimental demonstration of all important phenomena are very complete. The lecture room is fitted with shutters so that it can be darkened. A beam of sunlight directed by a fine clock heliostat outside may be thrown steadily across the lecture table for experiments in light, or used in connection with the solar lantern for a variety of other work. Adjacent to the lecture room are the laboratory and the apparatus room. Both lecture room and laboratory are supplied with water and gas.

An eight-inch Willyoung induction coil with storage and X-Ray accessories is used in the study of light-tension electricity.

This department has also a double dissolving arc-light Ideal Stereopticon, which is used by various other departments of the University.

ENGINEERING

In a partly developed territory like Arizona the engineer is called upon for the solution of a great variety of problems in the various lines of civil, hydraulic, mechanical and mining engineering, and in many difficult situations he must depend upon his knowledge and inventive ingenuity to supplement a meager equipment. To prepare the engineering student for such experiences the apparatus in this department has been chosen with a view to giving him the greatest familiarity with the theory, construction and use of those instruments and machines which observation has shown to be of universal adoption in practical engineering work. This apparatus embraces surveyors' and engineers' chains; standard field and pocket tapes; plain and solar compasses and transits; mining transits; engineers' levels; stadia, level and transit rods; aneroid barometers; odometer; automatic water-registers; hook-gauges; three forms of current-meter; stop-watch; meteorological instruments; drafting instruments; mechanical calculators; blue-print apparatus; a four and one-fourth inch astronomical telescope with equatorial mountings and accessories; celestial sphere; pumps, steam-guages; indicators; planimeter and calorimeter.

AGRICULTURE AND HORTICULTURE

Because of the situation of the Territorial University the educational work in agricultural and horticulture has taken peculiar form, being largely conducted on the correspondence plan, particularly through the "Timely Hints for Farmers" issued under the auspices of the Experiment Station, but of distinct educational value. Three thousand farmers of the Territory are reached regularly twice a month by timely publications on subjects of vital interest. The Twenty-second Legislature having made provision for a conductor of Farmers' Institutes, announcement will soon be made in regard to this work, which will probably take the form of short courses in agriculture.

Small and well selected agricultural libraries of slight cost have been forwarded to a considerable number who have expressed a willingness to receive them.

It is believed that this method of dealing with our situation will become increasingly useful.

The equipment for agricultural instruction is good, consisting of an excellent seed collection, a green-house and gardens for experimental purposes containing many rare and interesting plants, and a well-selected agricultural library.

MINING AND METALLURGY

The assay laboratory is equipped with assay furnaces for crucible work, for scorifying and cupeling, and for retorting mercury from amalgam, besides all needed appliances for assaying by dry and wet methods, including electrolysis. The laboratory also has desks and fittings for the chemical work required in the metallurgical and mineralogical investigation and analysis of ores and mineral fertilizers, and in qualitative tests of minerals.

MECHANIC ARTS

The mechanic arts building provided largely through the generosity of the Copper Queen Consolidated Mining Company, has a total floor area of 7,900 square feet, divided as follows: Power room and draughting room, each 1,200 square feet; wood-working shop, forge shop and machine shop, each 1,400 square feet; wash room, 600; model room, 400, and store room 300 square feet.

Each shop provides working space for twenty-four students at benches or forges and ample space for machines and tool rooms. The draughting room accommodates thirty-six students.

The power room contains an engine, a new 15-horse-power motor, a blower and exhauster.

The wood-working shop is equipped with a full assortment of hand tools, four wood-turning lathes, a universal wood-worker, a dimension sawing machine and other modern wood-working appliances.

The forge room contains twenty-four down-draught forges, twenty-four anvils, a blacksmith drill-press and all necessary small tools.

The machine shop contains three 14-inch engine lathes, one 24-inch engine lathe, one 16-inch shaper, one 24-inch planer, one 24-inch drill, one universal milling machine, one grinding machine, several small machines, vises and a complete outfit of small tools.

The entire building is well lighted and ventilated and the draughting room is heated by steam.

MILITARY

Room O in University Hall is used as an armory. It is fitted with the necessary gun racks and accessories. The equipment includes 150 old style Springfield rifles, 100 Springfield cadet rifles with complete accoutrements, eight swords and belts, one 3-inch muzzle-loading rifle with carriage and complete equipment, together with necessary musical instruments and signal flags.

THE GYMNASIUM

Herring Hall, the new gymnasium, has been fully equipped for the use of the students for the purposes of physical culture and athletics. The equipment, procured from the Narragansett Machine Co. of Providence, R. I., at an expense of about $1,500, includes 96 lockers, chest weights, dumb bells, bar bells, Indian clubs, a Medart vaulting-horse, parallel bars, a horizontal bar, a quarter-circle, an abdominal chair, striking bag and drum, wrestling machine, wrist machine, finger machine, chest developer, chest expander, climbing-rope, flying rings, traveling rings, jump and vaulting stands, fencing foils and masks, basket ball and goals, five large mats, and a set of anthropometric apparatus. In the bath-room a heater and large reservoir provide hot water for the five shower-baths.

GENERAL INFORMATION

The departments and courses of study of the University are arranged as follows:

I. COLLEGE OF AGRICULTURE AND MECHANIC ARTS.

A literary course leading to the degree of Bachelor of Philosophy.

A scientific course leading to the degree of Bachelor of Science.

An engineering course leading to the degree of Bachelor of Science in Engineering.

An agricultural course leading to the degree of Bachelor of Science in Agriculture.

A chemistry course leading to the degree of Bachelor of Science in Chemistry.

II. SCHOOL OF MINES.

A mining engineering course leading to the degree of Bachelor of Science in Mining.

A two years' course in mineralogy and assaying.

A bureau of mines and assaying.

III. AGRICULTURAL EXPERIMENT STATION.

IV. SUB-COLLEGIATE DEPARTMENT.

English, classical and scientific subjects.
Manual training and domestic science.
Bookkeeping and stenography.

COLLEGE OF AGRICULTURE AND MECHANIC ARTS

The courses offered in the College of Agriculture and the Mechanic Arts provide a liberal training for young men and women along literary and scientific lines, and for young men along engineering, mechanical and agricultural lines. Great latitude of election is given in the literary and scientific courses, but the course in engineering is more rigid in its requirements. Full details of the various courses follow. In all the courses the aim is to combine the practical with the theoretical in instruction. The needs of a young and growing commonwealth are kept in mind, and in all courses some instruction is provided which has for its aim the making of good citizens.

ARIZONA SCHOOL OF MINES

The School of Mines is designed for the education and training of young men in the arts and sciences directly involved in the industries of mining and metallurgy. Especial attention is given to the sciences of mathematics, physics, chemistry, mineralogy, geology, and their applications. The two years' course in Assaying is designed to prepare students as assayers only. The Bureau of Mines and Assaying, while not directly connected with the work of instruction, affords, with its laboratory and the influx of new material, a valuable object lesson to the advanced students of mining and metallurgy.

REGISTERING

All students are required to register on registration day at the beginning of the year and at the beginning of the second semester, in the president's office. A matriculation fee of $5.00 is required of all students upon entering the University. No student will be registered until the matriculation fee has been paid. After this fee is once paid no further fee is required for registration. After registration no change in classes can be made without the consent of the committee on registration.

TUITION

Tuition is free to students from Arizona. For all non-resident students, tuition is $10 for each semester. No reduction will be made for late registration or for early withdrawal.

RECORDS

The class standing of each student is determined by the instructor in charge. The method of ascertaining the student's record is left to the instructor, and his report in all cases is final.

Reports of standing in classes are sent every two months from the president's office to parents or guardians. Such persons are urgently requested to co-operate with the president and faculty in securing from the students steady attention to University duties, and a high grade of work.

DISCIPLINE

The disciplinary policy of the University in all its departments is based upon the assumption that the students are young gentlemen and young ladies, who come to the institution with a high determination to utilize to the full the opportunities offered, and with a keen sense of duty, honor, and courtesy to each other and to the faculty. Formal and explicit prohibitions and rules are few, but those will be rigidly enforced, with adequate penalties, and good order and discipline maintained. The University is a civil, rather than a military, community, and such liberty as will not be abused will be allowed all classes of students. In aggravated cases, such as cheating in University work, frequenting saloons, gambling houses, and other objectionable places, and serious breaches of peace or order, the faculty will not hesitate to proceed to the extreme measure of expulsion. In cases of expulsion, the student is required by regulations of the Regents and faculty to leave the campus immediately, and by Territorial statute to surrender his cadet uniform to the University. In all matters of discipline the faculty and president will strive for fairness, equity, and efficacy rather than uniformity.

Students or classes desiring to make requests of the faculty should file their petition in the president's office before the hour of faculty meeting; class petitions must be presented at least two days before the time of meeting.

VACATIONS AND HOLIDAYS

A short recess (see calendar, page 2) is taken at Christmas time. The long summer vacation begins about June first and continues until the middle of September. The Thanksgiving recess extends from the close of the regular exercises on the Wednesday before Thanksgiving to the next Monday morning.

All legal holidays are observed by the cessation of ordinary University work.

Appropriate exercises, in which the students will be expected to join, may be arranged by the faculty for any legal holiday.

Arbor day has been formally adopted by the University Regents as the regular anniversary on which shall be celebrated the founding of the institution, in connection with the ceremonies of tree planting.

LIVING ACCOMMODATIONS

Provision is made as far as possible for furnishing board and rooms to students of both sexes upon the University grounds. All students who have rooms in the dormitories are required to take their meals at the Dining Hall. Students who do not lodge in the dormitories may board at the Dining Hall.

Young men have excellent quarters in South Hall, a new dormitory building. North Hall, the home of the young ladies, is in charge of an experienced and capable preceptress who has constant supervision of those rooming there.

Both dormitories are lighted by electricity. Rooms contain a clothes-press, and are provided with single bedsteads, table, chairs, mirror, wash-bowl, pitcher and slop-jar. Students will supply their own mattresses, pillows, sheets, blankets, towels, rugs, brooms, and such other articles as they may desire for their rooms. They will care for their own rooms under the direction of the instructor in charge of the dormitory.

FEES AND EXPENSES

	Highest.	Lowest
Tuition, free to students from Arizona.........		
" students non-resident in Arizona, each semester	$10.00	$10.00
Matriculation (paid but once)	5.00	5.00
Laboratory and shop fees, varying according to courses, per annum	1.00	30.00
Mining excursions, for advanced students	20.00	50.00
Books, per annum	5.00	20.00
Board, per month	16.00	20.00
Lights per room, per month	.50	1.50
Napkins	.50	.50

By resolution of the Board of Regents of the University, board is to be paid in advance on the first day of each month. Checks, postoffice or express money orders should be made payable to the president. No reduction will be made for absence for a period of less than one week, except by special arrangement.

Students leaving the University before the end of the semester will receive no rebate from fees.

Text-books required are obtained directly from the publishers through a book association managed on the co-operative plan under the direction of the faculty.

Members of the cadet companies wil be required to provide themselves with the prescribed uniform, which will be ordered by the University. The cost of uniform, which must be deposited in advance, during the present year nas been $16.25. This uniform has shown better wearing qualities than a civilian suit of equal cost, and parents are urged to consider the matter of uniform when supplying their sons with clothing for the approaching University year. It may be worn on all occasions, and thus will remove the necessity for additional expenditure for outer clothing other than overcoats. When the warm weather of the spring comes, the students are expected to purchase the regulation khaki uniform and campaign hat, the total expense being about $6.

Provision has been made to a limited extent for the self-support of students, preference being given to students from Arizona, who have already spent some time in the University.

RAILROAD RATES

The Southern Pacific, the Maricopa, Phoenix & Salt River Valley, the Santa Fe, Prescott & Phoenix, and the Gila Valley, Globe & Northern railways have all generously allowed students in attendance upon the University half rates when journeying to and from their homes. This applies only to those parts of these railroads in Arizona. In the case of students coming to the University, these half rates may be secured by notifying the president of the University at least two weeks in advance, to enable him to secure the permits from the proper authorities. Tickets may then be obtained by the student on application to his own local railroad ticket agent, or to the nearest agent of the designated road, within the Territory. Students at the University may secure transportation to their homes and return at vacation time by making application at the office of the president of the University. In case of any misunderstanding with the ticket agent, the student should pay full fare, take the agent's receipt and report the matter to the University authorities. The University cannot undertake to secure rebates from the railroad companies in cases where the regular permits have not been issued.

REQUIREMENTS FOR ADMISSION

Applicants for admission to any department of the University will be required to furnish satistactory evidence of good moral character, and a certificate of graduation or of honorable dismissal from the schools with which they were last connected.

Beginning with September, 1904, for admission to the Freshman class, applicants must be at least sixteen years of age and must satisfy requirements in subjects sufficient to give sixteen credits as described below. A credit is understood to be the equivalent of one study pursued satisfactorily for one year, one period a day, as ordinarily taught in high schools.

Students coming from approved high schools, and presenting a detailed official statement of work completed from the principals of such schools, may be excused by the committee on registration from entrance examinations in those subjects covered by the credentials.

For admission to the course leading to the degree of Bachelor of Philosophy the subjects upon which examinations must be passed, and the credits assigned each, are:

English	4	Latin	3
Mathematics	2	Greek, French, German or Spanish	2
History and Civics	2	Science	1
Elective	2		

For admission to the course leading to the degree of Bachelor of Science, including the degrees of Bachelor of Science in Mining, Engineering, Chemistry or Agriculture, the subjects upon which examinations must be passed, and the credits assigned each, are:

English	4	French, German or Spanish	2
Mathematics	4	Science (Physics required)	3
General History and Civics	2	Elective	1

The scope of work required in these various subjects is as follows:

ENGLISH—(a) English classics. An acquaintance with the works named below. These works are divided into two classes, those intended for thorough study and those intended for general reading. The portion of the examination devoted to the former class will be upon subject matter, form and structure. In addition, the candidate may be required to answer questions involving the essentials of English grammar, and the leading facts in those periods of English literary history to which the prescribed books belong. In the portion of the examination devoted to the latter class, the candidate will be required to present evidence of a general knowledge of the subject matter, and to answer simple questions on the lives of the authors. The form of examination will usually be the writing of a paragraph or two on each of several topics, to be chosen by the candidate from a considerable number—perhaps ten or fifteen—set before him in the examination paper. The treatment of these topics is designed to test the candidate's power of clear and accurate expression, and will call for only a general knowledge of the substance of the books. In preparation for this part of the requirement, it is important that the candidate shall have been instructed in the principles of writing English. A knowledge of grammar is presupposed. (b) English compositon. This requirement can be met only by examination of the candidate or by his presenting satisfactory compositon books on themes certified by a former teacher as original uncorrected work. The examination will take the form of a theme of five hundred words on some subject familiar to the candidate and will be a practical test of his ability to express himself in writing clearly and consecutively. No candidate will be accepted whose work is notably defective in point of neatness, spelling, punctuation, idiom, or division into paragraphs. Those found lacking in compositon will be required to make good the deficiency at once in a special class organized for that purpose.

No student will be admitted without examination, except on the certificate from his former instructors that the entire requirement has been fulfilled. Substantial equivalents, properly certified, will be accepted.

For thorough study: For 1902, 1903, 1904, 1905, Shakespeare's Macbeth; Milton's L'Allegro, Il Penserose, Comus, Lycidas; Burke's Speech on Conciliation with America; Macaulay's Essays on Milton and Addison.

For general reading: For 1903, 1904, 1905, Shakespeare's Merchant of Venice and Julius Caesar; the Sir Roger de Coverley Papers in "The Spectator"; Goldsmith's Vicar of Wakefield; Coleridge's Rime of the Ancient Mariner; Scott's Ivanhoe; Carlyle's Essay on Burns; Tennyson's The Princess; Lowell's Vision of Sir Launfal; George Eliot's Silas Marner.

MATHEMATICS—Arithmetic as covered in White's Advanced Arithmetic to the appendix, but these subjects will be omitted in the entrance examinations: longitude and time, present worth, stock investments, exchange, equation of payments, compound proportion, partnership and cube root. Algebra, through quadratic equations, as given in Wells's Essentials of Algebra, or Wentworth's New School Algebra. Plane geometry as treated in the latest editions of Wentworth or Wells.

HISTORY AND CIVICS—As much as is included in Adams's European History and Hinsdale's American Government, or text books covering equivalent ground. To meet these requirements a large amount of reference work is expected. In place of General History the following will be accepted: History of Greece and Rome as contained in Myer's histories of Greece and Rome or an equivalent, and Coman and Kendall's or Larned's History of England.

*GREEK—As covered by Gleason and Atherton's Beginners' Greek Book, Xenophon's Anabasis, four books, Homer's Iliad, three books, with composition and the use of Hadley and Allen's or Goodwin's Greek Grammar.

*LATIN—As covered by Collar's First Latin Book and Viri Romae, together with Allen and Greenough's Grammar and texts; sight reading; Caesar, four books or an equivalent; Cicero, four orations; Vergil, six books; sight reading from Nepos, Cicero and Gellius; Daniell's or Bennett's Prose Compositon.

*FRENCH—As covered by Whitney's French Grammar, parts I and II; composition; Super's French Reader; Halévy, L'Abbé Constantin; Mérimée, Colomba; Moliére, Le Médicin malgré lui and Le Bourgeois Gentilhomme, and at least 300 pages from five different authors.

*SPANISH—De Tornos, Combined Spanish Grammar; Worman's First and Second Spanish Readers, Loiseaux, Elementary Spanish Reader; Valdis, Jose; Maratin, El si de los Niños; Alarcón, El Capitán Veno; Galdós, Doña Perfecta; Cervantes, Don Quixote.

*GERMAN—As covered by Kellner's German Grammar; compositon; Guerber's Maerchen und Erzaehlungen, together with Riehl, Der Fluch der Schoenheit; Schiller, Marie Stuart and Jungfrau von Orleans; Goethe, Hermann und Dorothea, Iphigenia; Lessing, Minna von Barnheim.

SCIENCE—Under this head may be offered the required number of credits in the following subjects: physical geography, physiology, botany, chemistry, physics, elementary astronomy. At least half the preparation in science should consist of laboratory work. Note-book, covering such laboratory work as has been performed by the student, should be presented for examination.

ELECTIVE—The remaining credits required may be made up from additional subjects ordinarily taught in high schools.

ADVANCED STANDING AND CREDENTIALS

Students from other institutions of equivalent rank may be admitted to the higher classes upon the presentation of properly authenticated certificates showing to the satisfaction of the faculty that they are qualified to proceed with the desired work.

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* If any language is offered it must be to the extent of two credits, since a single year's study of a language is not considered of sufficient educational value to be entitled to credit.

Arrangements have been made with the Arizona Normal School at Tempe, and the Northern Normal School at Flagstaff, whereby students from these institutions may have their record transferred to the books of the University with proper credit, upon presentation of a certificate duly signed by tne principal. Students of this University may also obtain the equivalent privilege at the Normal Schools by presenting the proper certificate of standing, signed by the president.

The faculty desires to establish such relations with high schools and other educational institutions as will enable it to accept their certificates without question. To this end presiding officers are respectfully requested to correspond with the president.

COURSES OF STUDY AND DEGREES

All facilities and privileges of the University are open to qualified persons of both sexes.

The University offers four-year courses of study leading to the degrees of Bachelor of Philosophy and Bachelor of Science, and to those degrees specialized as shown on page 29. In each course the work is partly required and partly elective, as described by schedules later. Each student doing full work is required to take four hours of recitation work each day. In laboratory work a period of from two to two and one-half hours is considered the equivalent of one recitation hour.

Persons of mature age and with sufficient preparation who are not candidates for a degree will in some cases be admitted to regular classes as special students, provided, however, that in all such cases they show to the satisfaction of the instructors in charge that they can take the course with profit to themselves and without detriment to the regular class.

The faculty reserves the right to omit classes in any course of instruction unless a suitable number of students register for the course.

Students who have completed satisfactorily the required work, and the specified amount of elective work as shown in the accompanying schedules will be given the degree of Bachelor of Philosophy or Bachelor of Science. The special character of any course of study may be indicated by adding to the degree the name of the department, as: Bachelor of Science in Mining, or Bachelor of Science in Chemistry.

The advanced degrees of Master of Science and Master of Arts will be conferred upon Bachelors, graduates from this University of from institutions of equivalent grade, who have successfully pursued at the University a course of study marked out by the faculty and requiring not less than one year.

COURSES OF INSTRUCTION

The following schedule shows the courses in which instruction is offered. The courses themselves are explained later.

Military science and tactics or physical culture is required during the Freshman and Sophomore years. If for any reason a student is excused from these exercises, an additional subject having a minimum of three recitation hours per week will be required.

Ordinary numbers within parentheses indicate hours of recitation per week; when no number is given five hours per week is understood.

Ordinary numbers within brackets indicate the number of units of credit toward a degree given by any course. For explanation of the unit system, see next page.

Numbers outside parentheses are the numbers of the courses as outlined on page 30 and following.

FRESHMAN YEAR.

Units
[4] Mil. Sci. and Tactics (5)
[4] Physical Culture (5)
[8] English 1, 2
[8] Mathematics 1, 2
[8] Latin 1, 2
[8] French 1, 2
[3] Public Speaking 1, 2

Units
[8] German 1, 2
[8] Spanish 1, 2
[8] History 1, 2 (4)
[8] Botany 1, 2
[8] Mechanic Arts 1, 2
[8] Chemistry 1, 2
[4] Artistic Drawing 1, 2 (2)

SOPHOMORE YEAR.

Units.
[4] Mil. Sci. and Tactics (5)
[4] Physical Culture (5)
[6] English 3, 4 (3)
[8] Mathematics 3, 4
[8] French 3, 4 (4)
[8] Latin 3, 4 (4)
[8] German 3, 4 (4)
[8] Spanish 3, 4 (4)
[8] Botany 3, 4

Units.
[8] Chemistry 3, 4
[8] Chemistry 9, 10
[4] Mineralogy 3
[4] History 3 4, (2)
[8] Engineering 1, 2
[6] Physics 1, 2 (3)
[4] Mechanic Arts 3, 4 (2)
[4] Mechanic Arts 5, 6 (2)

JUNIOR YEAR.

Units.
[2] Mil. Sci. and Tactics (4)
[2] Physical Culture (4)
[4] English 5, 6 (3)
[4] English 7, 8 (2)
[9] Mathematics 5, (4) 6 (5)
[4] Economics 1, 2 (2)
[4] Economics 3, 4 (3)
[3] Public Speaking 3, 4 (2)
[8] Zo-ology 1, 2

Units.
[8] Mineralogy 1, 2
[4] History 5, 6 (3)
[4] History 7, 8 (2)
[4] Sociology 1, 2 (3)
[8] Chemistry 5, 6
[8] Engineering 3, 4 (4)
[2] Photography 2 (2)
[4] Mechanic Arts 7, 8 (2)

SENIOR YEAR.

Units.
[4] English 9, 10 (2)
[4] English 11, 12 (3)
[4] Psychology 1
[4] Pedagogy 2
[4] History 9, 10 (3)
[4] History 11, 12 (3)
[8] Geology 1, 2

Units.
[4] Logic 1 (4)
[4] Logic 2—
[3] Ethics 2 (3)
[8] Chemistry 7, 8
[8] Engineering 5, 6 (4)
[8] Engineering 7, 8 (4)
[4] Engineering 9, 10 (3)
[4] Engineering 11 (4)

CREDIT TOWARD DEGREES

Credit toward degrees is given by means of a unit system which assigns to each course of instruction offered a certain number of units of credit. One hundred twenty-eight units besides eight units in Military Science and Tactics and Physical Culture are necessary for obtaining a degree in any course.

Any candidate for a degree may present as part fulfillment of requirements for graduation an acceptable thesis embodying the results of a special study of some subject within the range of the course pursued. The subject of the thesis must be submitted for the approval of the faculty at the opening of the Senior year, and the completed thesis must be presented not later than three weeks before commencement day. The credit value will be determined by the faculty at the time the subject is approved.

The number oi units of work offered in different subjects is shown in the following scheme:

	Units.
English	30
Oratory	6
Mathematics	24
GROUP A.	
Latin	16
French	16
German	16
Spanish	16
GROUP B.	
History	28
Economics	8
Philosophy	19
Sociology	8

GROUP C.	Units.
Botany	16
Zo-ology	8
Chemistry	32
Met. Chem. and Ass'ng.	10
Geology	8
Mineralogy	12
Physics	6
Photography	2
GROUP D.	
Mechanic Arts	20
Engineering	40

The units necessary for the degree of Bachelor of Philosophy are as follows:

I. Required—English, 24 units; Philosophy, 15 units; History and Economics, 8 units.

II. Group Electives—From Group A, 32 units; from Group C, 16 units.

III. Free Electives—33 units.

The units necessary for the degree of Bachelor of Science are as follows:

I. Required—English, 8 units; Mathematics, 16 units.

11. Group Electives—From Group B, 4 units; from Group C and D, 56 units.

III. Free Electives—44 units.

To obtain the degree of Bachelor of Science *in Mining* the following courses must have been elected:

Mechanic Arts, 1, 2; Engineering, 1, 2; Engineering, 3, Engineering, 5, 6; Engineering, 7, 8; Mineralogy, 1, 2; Geology, 1, 2; Chemistry, 9, 10; Metallurgy, 1, 2.

To obtain the degree of Bachelor of Science *in Chemistry* the students shall have received 32 units in Chemistry and 8 in Mineralogy.

To obtain the degree of Bachelor of Science *in Engineering* the student must complete Mechanic Arts, 1, 2, 3, 4, 5, 6 and 32 units in Engineering.

To obtain the degree of Bachelor of Science *in Agriculture* the following course is required:

Freshman Year—English, Solid Geometry, Trigonometry, Higher Algebra, Modern Language, Mechanic Arts.

Sophomore Year—Higher Algebra, Analytic Geometry, Meteorology, Chemistry, Surveying, Botany, Drawing, Farm Equipment, Soil and Irrigation.

Junior Year—Farm Crops, Breeds of Live Stock, Botany, Anatomy, Zo-ology, Entomology, Floriculture, Landscape Gardening, Forestry, Horticulture.

Senior Year—Stock Breeding and Feeding, Dairying, Veterinary Medicine, Geology, Fruits and Fruit Culture, Vegetables and Vegetable Culture.

EXPLANATION OF COURSES OF INSTRUCTION

Courses having odd numbers are given in the first semester. Those having even numbers, in the second semester. The hours mentioned show the number of periods per week.

ENGLISH

PROFESSOR HALL

The purpose of the courses outlined below is to give a general knowledge of English literature from the sixteenth century to the present time. Chief stress is placed upon the study of a few authors of the most important periods, though the history of our literature is also traced from age to age.

The course in composition aims to develop accurate thought and clear, vigorous expression.

ENGLISH 1, 2. NINETEENTH CENTURY PROSE, CRITICISM AND BRIEF HISTORY. (a)—Appreciative, sympathetic criticism of the chief novelists and essayists of the nineteenth century, based upon careful study and comparison; lectures and discussions; frequent short themes upon assigned and chosen subjects. (b)—A brief survey of the history of English literature, with reading, lectures and discussions. Open to all students. Five hours. [8]

ENGLISH 3, 4. RHETORIC AND COMPOSITION—Expository and argumentative composition; briefs, themes, essays. Lectures and discussions. Text-books, MacEwan's Essentials of Argumentation, Genung's Practical Rhetoric and Rhetorical Analysis, Baker's Specimens of Argumentation (modern). Open to students who have taken English 1, 2. Three hours. [6]

ENGLISH 5, 6. ELIZABETHAN LITERATURE—Shakespeare, selected plays; other Elizabethan dramatists, especially Jonson and Marlowe; Spenser's Faerie Queene and shorter poems. Lectures and discussions. Open to students who have taken English 1, 2. Three hours. [4]

ENGLISH 7, 8. EIGHTEENTH CENTURY LITERATURE—From the death of Dryden to the publication of the Lyrical Ballads, 1700-1798; special attention given to the Queen Anne period and the early romantic revival. Lectures and discussions. Open to students who have taken English 1, 2. Two hours. [4]

ENGLISH 9, 10. SEVENTEENTH CENTURY LITERATURE—From the closing of the theaters to the death of Dryden, 1642-1700. Lectures and discussions. Open to students who have taken English 1, 2. Two hours. [4]

ENGLISH 11, 12. NINETEENTH CENTURY POETRY—From the publication of the Lyrical Ballads to the death of Tennyson, 1798-1892. Lectures and discussions; Macmillan's Globe editions. Open to students who have taken English 1, 2. Three hours. [4]

LATIN

INSTRUCTOR STANLEY

The courses below are open to students who have completed the first two years of Latin in the sub-collegiate department, or an equivalent. Constant, thorough drills are given in technical grammar and prose compositon. In reading, the matter is subjected to grammatical, metrical, rhetorical and historical explanation. The study of the text is made the means of mental discipline, of developing the faculties of observation and critical judgment, and of acquiring habits of thoroughness and accuracy.

LATIN 1, 2. CICERO AND VERGIL—Cicero's Orations, the four Catilinarian; Vergil's Aeneid, six books. Allen and Greenough's texts. Sight-reading from Nepos, Gellius and Cicero; Daniell's Prose Composition throughout the year. Five hours. [8]

LATIN 3, 4. LIVY, HORACE, CICERO—Livy, book XXI; Horace, selected Odes, Satires; Cicero, De Amicitia and De Senectute; Latin prose composition and sight reading. Open to students who have taken Latin 1, 2. Four hours. [8]

MODERN LANGUAGES

PROFESSOR DeWALSH

The object of the following courses is to make the student acquainted with the grammatical structure, phonology and choice literature of the respective languages. As much as possible the language is spoken in the class-room. Frequent reference is made to the principles of comparative philology.

GERMAN

GERMAN 1, 2. Collar's Shorter Eysenbach Grammar, Mueller-Wenkebach "Glueck Auf!"; Auerbach "Brigitta , Rosegger "Waldheimat." Colloquial exercises. Lectures on German life. Open to all students. Five hours both semesters. [8]

GERMAN 3, 4. Freytag, "Die Journalisten"; Schiller "Wilhelm Tell"; Goethe "Egmont"; Lessing "Emilia Galotti." Colloquial exercises. Lectures on the German Drama with special reference to Lessing's "Hamburgische Dramaturgie." Open to students who have taken German 1, 2. Four hours both semesters. [8]

GERMAN 5, 6. Das Nibelungenlied. Lectures on the Great German Epic and on conditions in ancient and mediaeval Germany. Open to qualified students at special appointment with the instructor.

FRENCH

FRENCH 1, 2. Bacon's New French Course; Daudet "L'enfant Espion"; Mérimée "Colomba"; Colloquial exercises. Lectures on French life. Open to all students. Five hours both semesters. [8]

FRENCH 3, 4. Erckmann-Chatrian "Madame Thérése" Racine "Iphigéne"; Rostand "Les Romanesques"; Hugo "Les Misérables." Colloquial and grammatical exercises. Lectures on French literature. Open to students who have taken French 1, 2. Four hours both semesters. [8]

SPANISH

SPANISH 1, 2. Garner's Spanish Grammar; Loiseaux' Elementary Spanish Reader; Moratin "El Sí de las Niñas"; Mario y De Santoval "Tocino del Sielo." Colloquial exercises. Open to all students. Five hours both semesters. [8]

SPANISH 3, 4. Alarcón "El Capitán Veneno"; Galdós "Doña Perfecta"; Cervantes "Don Quijote." Grammatical and colloquial exercises. Lectures on Spanish literature. Open to students who have taken Spanish 1, 2. Four hours both semesters. [8]

HISTORY, POLITICAL SCIENCE AND PHILOSOPHY

PROFESSOR BABCOCK

INSTRUCTOR BUTTERFIELD

INSTRUCTOR STACEY

In the work in history emphasis is placed on the social and political development, the relation of cause and effect and the unity of history. The laboratory method is used wherever possible and individual work insisted upon. In political science the historical method is used, and the subject rather than any one writer's presentation of it is treated. After a brief presentation of pure economics, the course deals with practical questions. The course in philosophy is arranged with especial attention to the needs of teachers. Upon its completion graduates of the University will receive Territorial Teachers' certificates.

HISTORY

HISTORY 1, 2. ENGLISH HISTORY—Green's Short History of the English People used as a basis; much assigned reading. A thesis is required. Open to all students. Four hours. [8] (Miss Butterfield.)

HISTORY 3, 4. AMERICAN COLONIAL HISTORY—A detailed study of the American colonies under Great Britain, and of the United States to the adoption of the Constitution. Lectures and assigned reading. A thesis is required. Open to students who have taken History 1, 2. Two hours. [4] (Professor Babcock.)

*HISTORY 5, 6. ECONOMIC HISTORY OF THE UNITED STATES—A study of the causes and development of the economic history of the United States. Lectures and assigned reading. A thesis is required. Open to students who have taken History 1, 2. Three hours both semesters. [4]

*HISTORY 9, 10. CONSTITUTIONAL HISTORY OF THE UNITED STATES—A detailed study of the formation of the Union and of the political and constitutional history of the United States, based on letters and speeches of American statesmen, public documents and special histories. A thesis is required. Open to students who have taken History 3, 4. Three hours. [4] (Professor Babcock.)

POLITICAL SCIENCE

ECONOMICS 1, 2.—A study of the general principles and laws of political economy. Text-book, Walker's Advanced Political Economy. Open to Juniors and Seniors. Two hours both semesters. [4]

PHILOSOPHY

PSYCHOLOGY 1—A special consideration of the subject as applied to teaching. Lectures, recitations and collateral reading. Open to Juniors and Seniors. Five hours. [4]. (Mr. Stacey.)

PEDAGOGY 2—An account of educational evolution, both as a culture fact in the history of civilization and as a foundation for professional work; lectures, giving a brief but comprehensive outline of the school systems of ancient, mediaeval and modern countries with a special study of leading educators such as Socrates, Commenius, Pestalozzi, Froebel, Mann and others the present trend of pedagogical thought and practice, methods of teaching, school management, art of questioning

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* Not given in 1903-4

and school law. Arrangements have been made with the Tucson city schools to use the Holliday school as a practice school for this class. Open to students who have taken Psychology 1. Five hours. [4] (Mr. Stacey.)

LOGIC 1—Text-book, Jevons's Logic; reading from Mill, Hamilton, Thompson and others. Open to Juniors and Seniors. Four hours first semester. [4] (Mr. Stacey.)

ETHICS 2—Theoretical and practical ethics; view of the historical development of the science; origin and development of the moral consciousness; application of the principles of ethics to the problems of life. Lectures, discussions and assigned reading. Open to Juniors and Seniors. Three hours. [3] (Mr. Stacey.)

SOCIOLOGY

INSTRUCTOR STACEY

SOCIOLOGY 1. ELEMENTS OF SOCIOLOGY—A study of the characteristic concepts of sociological thought, designed to acquaint the student with the current theories of social interpretation. The course will include a discussion of the elements of association underlying social relations and institutions; the result of race, group, and individual competition; and some of the conditions of social progress. Fairbank's Introduction to Sociology will be used as a guide, and supplemented by lectures, collateral reading, and reports. Open to Juniors and Seniors. Three hours. [2]

SOCIOLOGY 2. CHARITIES AND CRIME. A consideration of social pathology, including an examination of the origin and nature of the dependent, defective, and delinquent classes. A study will be made of the principles and methods of relief; causes of crime; prison systems; juvenile offenders; preventative measures, etc. Guide: Warner's American Charities. This course is intended to be a continuation of Sociology 1, and will alternate with Sociology 4. Prerequisite, Sociology 1. Three hours second semester. [2]

SOCIOLOGY 3. PUBLIC OPINION—After examining the concept of the Social Mind, a study will be made of the growth, and guidance of public opinion, the psychology of fashion and fads, the psychology of epidemics, the psychology of crowds or mobs, and the function of public opinion in the guidance of national life. Letcures, reading and reports. Open only to advanced students. Prerequisite, Sociology 1. Not given in 1903-04. [2]

SOCIOLOGY 4. THE FAMILY—A study of domestic institutions in lower and higher civilizations. Attention will be given to the social ethics of the family, and to the legal, industrial, educational and religious problems of the family.

Westermark's History of Human Marriage will be used as a text. To alternate with Sociology 2. Prerequisite, Sociology 1. Three hours second semester. Not given in 1903-04. [2]

MATHEMATICS

PROFESSOR WOODWARD, PROFESSOR SMITH

It is the aim of the work in mathematics to train the student to the habit of logical and vigorous courses of reasoning, to show the wonderful breadth of application of higher mathematics, to display the beauties and pleasures of the demonstrations, methods, and results of higher geometry and calculus, and to give such practice in the use of these agents as will enable students who pursue the higher branches of engineering to use them naturally and easily in those numberless applications where they are indispensable.

MATHEMATICS 1. PLANE AND SPHERICAL TRIGONOMETRY—Text-book, Wells' Complete Trigonometry. Prerequisite, advanced algebra and solid geometry. Four hours. [4]

MATHEMATICS 2. COLLEGE ALGEBRA—Text-book, Wells' College Algebra. Four hours. [4]

MATHEMATICS 3. ANALYTIC GEOMETRY—Text-book, Nichols' Analytic Geometry. Prerequisite, Mathematics 1, 2. Four hours. [4]

MATHEMATICS 4. DIFFERENTIAL CALCULUS—Text-book, Nichols' Calculus. Prerequisite, Mathematic 3. Four hours. [4]

MATHEMATICS 5. INTEGRAL CALCULUS—Text-book, Nichols' Calculus. Prerequisites, Mathematics 4 and Physics 1. Four hours. [4]

MATHEMATICS 6. ANALYTIC MECHANICS—Lectures and recitations covering as fully as time permits the subjects of dynamics and strength of materials. Text-book, Merriman's Mechanics of Materials. Prerequisites, Mathematics 5, Engineering 7, Physics 1, Mechanic Arts 4. Five hours. [5]

BIOLOGY

PROFESSOR THORNBER

The courses which follow are calculated to articulate with the work done in biology in average western high schools.

The Desert Botanical Laboratory of the Carnegie Institution of Washington, D. C., has been located in the Tucson mountains adjoining Tucson, with Dr. W. A. Cannon, recently of the New York Botanical Garden, as resident director. In this laboratory, the southwest with its unique and as yet little investigated flora, gains what is destined to be one of the important centers of active, scientific research. The research facilities of the laboratory are all that could be desired, and the investigations upon the desert flora will appeal to students of botany from all quarters. In the light of the above, the importance of the Desert Botanical Laboratory to the University of Arizona and especially to the department of botany will be apparent.

BOTANY 1, 2. GENERAL BOTANY—Botany 1 treats of the general principles of the histology and physiology of plants. Botany 2 completes the year's work with a general survey of plant types from Protophyta to Spermatophyta; also the elementary principles of field botany. Guide, Bessey's Essentials of Botany, supplemented with other texts and lectures. The laboratory studies will form the basis of all the work. Open to all students. Five hours, or an equivalent, both semesters. [8]

BOTANY 3, 4. ADVANCED BOTANY—The second year's work is not definitely outlined, but is purposely left open to be formulated as the needs of the students applying appear to demand. Courses in general morphology of the fungi, morphology of the fungi with special reference to forms injurious to vegetation in the Southwest, also histology, physiology, and the taxonomy and ecology of the native flora and allied subjects are offered here. Opportunities are offered for research work. Open to all students who have taken Botany 1, 2. Five hours, or an equivalent, both semesters. [8]

ZO-OLOGY 1, 2. Conducted along lines corresponding very closely to those followed in Botany 1, 2. Laboratory studies as in that course are made the main feature of the work which is based upon living, native material where such is available; but some groups are necessarily studied by the aid of preserved specimens. In the study of the Mammalia constant reference is made to human anatomy, so that this portion is made in part a review of the course in anatomy and physiology offered in the sub-collegiate department. Textbook, Parker and Hazwell's Manual of Zo-ology. Open to all students. Five hours, or an equivalent, both semesters. [8]

PHYSICS

PROFESSOR SMITH

The object of this course is to acquaint the student with the physical principles which underlie the higher courses of chemistry, mechanics and engineering. Special attention is therefore given to the study of force and energy, the physics of liquids and gases, and heat. One-third of the course will be devoted to the study of electricity.

PHYSICS 1, 2. Lectures, recitations and laboratory work. Open to students who have taken a course in elementary physics and mathematics. Three hours, or an equivalent, both semesters. [6]

CHEMISTRY

PROFESSOR GUILD, MR. PROUT

The instruction in chemistry has two main objects in view: first to promote general culture; and secondly, to introduce students to technical work, especially in mining. The first two years' work in general chemistry, qualitative and quantitative analysis, places the student in a position to take up advantageously the study of mining, agricultural chemistry or metallurgy.

CHEMISTRY 1. GENERAL CHEMISTRY—Lectures illustrating the chemical properties of the elements and their compounds, supplemented by recitations and laboratory practice. Text-book, Remsen's Briefer Course. Open to all students. Five hours, or an equivalent. [4]

CHEMISTRY 2. QUALITATIVE ANALYSIS—Practical work in the laboratory, including the analysis of alloys, commercial products, minerals, and like substances. The course is accompanied by lectures and recitations. Text-book, Eliot and Storer's Qualitative Analysis, and various reference books. Open to students who have taken Chemistry 1. Five hours, or an equivalent. [4].

CHEMISTRY 3. QUANTITATIVE ANALYSIS—Laboratory practice with lectures and recitations; the work will be chiefly in gravimetric methods of analysis. Text-books, Classen's Quantitative Analysis. Open to students who have taken Chemistry 2. Five hours, or an equivalent, first semester. [4]

CHEMISTRY 4. VOLUMETRIC ANALYSIS AND FIRE ASSAYING—A continuation of the work in Chemistry 3, special attention being given to the methods of assaying employed in the West. Five hours or an equivalent, second semester. [4]

CHEMISTRY 5. METALLURGICAL CHEMISTRY—The greater part of the time in this course is given up to the cyanide process for the extraction of gold. The analysis of metallurgical products also receives attention. Open to students who have taken Chemistry 4. May be taken as a three or five hour course, first semester. [2 or 4]

CHEMISTRY 6. SPECIAL QUANTITATIVE ANALYSIS. —The analysis of water, gases, oils, minerals. Open to students who have taken Chemistry 4. Five hours, or an equivalent, second semester. [4]

CHEMISTRY 7, 8. ORGANIC CHEMISTRY—Lectures on the carbon compounds; laboratory work in organic analysis and the preparation of organic compounds; vapor density and molecular weight determination. Open to students who have taken Chemistry 3, 4. Four hours or an equivalent, both semesters. [8]

CHEMISTRY 9. SYNTHETIC CHEMISTRY.—The preparation of pure chemical compounds from the crude mineral products. Open to students who have taken Chemistry 4. Three hours, or an equivalent, first semester. [2]

CHEMISTRY 10. PHYSICAL CHEMISTRY—Lectures Historical introduction leading up to a discussion of modern chemical theories. Open to students who have taken Chemistry 3. Two hours, second semester. [2]

CHEMISTRY 11, 12. CHEMISTRY OF THE RARE ELEMENTS—The analysis and synthesis of uranium, molybdenum, tungsten, vanadium and cerium compounds. Open to students who have taken Chemistry 6 and 9 and German 4. Four hours, or an equivalent, both semesters.

MINERALOGY

PROFESSOR GUILD

The main object of the course in mineralogy is to familiarize the students with facts and methods that will enable him to determine the character of an ore or mineral by an observation of its physical properties and by the performance of a few simple tests with the blow-pipe. The value of such a course cannot be over-estimated, since these quick methods of analysis are frequently needed in the field and mine when recourse cannot be had to a well-equipped chemical laboratory. The course is of value also to the student of general science, since it adds to the pleasure of a day in the mountains or field, and is necessary to a full appreciation of the study of geology. The course is not only practical, but the theoretical side of the subject receives attention in mineral optics, crystallography and similar topics.

MINERALOGY 1, 2—Lectures and recitations in crystallography and the classification and uses of minerals; laboratory work in blow-pipe analysis and determinative mineralogy; work with the reflecting goniometer in measuring the angles of crystals, and with the polariscope in studying the optical properties of minerals; the study of a type collection of 600 minerals arranged and classified according to Dana. Textbooks, Dana's Text-Book of Mineralogy and Brush's Manual of Determinative Mineralogy and Blow-Pipe Analysis. Open to students who have taken Chemistry 2. Five hours, both semesters. [8]

MINERALOGY 3. Advanced crystallography and microscopic study of the rock-forming minerals. Open to students who have taken a course in elementary geology, Mineralogy 2, and Physics 2. Three hours or an equivalent, first semester. [2]

MINERALOGY 4. PETROLOGY—The preparation of thin section of rocks for microscopic study, rock analysis, and the study of a type selection of rocks. Text-book, Harker's Petrology for Students. Open to students who have taken Mineralogy 3. Three hours, or an equivalent, second semester. [2]

PHOTOGRAPHY

ASSOCIATE PROFESSOR SKINNER

PHOTOGRAPHY 2. The course in photography is designed to meet the needs of mining and engineering students. No attempt is made to teach the subject as an art; but the student is instructed in the use of the camera, the various processes of the development and making of photographs, and the uses and applications of photography in the applied sciences. Lectures are given upon the chemical and physical action of light, and photographic optics, and a survey of the University campus is made by the photographic method. The course presupposes an elementary knowledge of chemistry and physics. Open to members of the Sophomore, Junior, and Senior classes, and to such special students as are qualified to take the work. Lectures one hour, laboratory work two to four hours, second semester. [2]

ASTRONOMY

PROFESSOR BLAKE

A short course of instruction in astronomy is given as an introduction to the study of geology. In this course the relations of the earth to the solar and stellar systems are considered as also are the form of the earth and its motions in their relations to climate and geologic changes. The astronomy being considered a part of geology is granted no independent credit toward any course of study. Open to Seniors. Lectures and recitations.

GEOLOGY

PROFESSOR BLAKE

The objects of the course of instruction in geology are chiefly general culture and practical advantages gained in agriculture and mining. The student is instructed regarding the changes that have taken place upon the globe; in the formation of rocks, soils and mineral deposits, and in the progress of life and the environment of humanity.

GEOLOGY 1. General Geology—Astronomical introduction. (See Astronomy, above.);

Geology. Geognosy—The formation and composition of the crust of the earth, rock-forming minerals, crystalline and mechanically and chemically formed rocks;

Dynamic Geology—Erosive agencies, transportation and deposition of rock-forming materials; the origin of soils and their distribution; volcanic formations, metamorphism;

Structural Geology—Stratification and the movements to which strata have been subjected; uplifts and depression; folding and complication; origin of mountain chains;

Historical Geology—The sequence of formations—the geologic record; origin and progress of life; theories of selection and evolution; paleontology.
Five hours, first semester. [4]

GEOLOGY 2. Economic Geology—In the second semester a course of lectures is given upon the nature and origin of mechanically-formed deposits; upon the various theories of origin and the systems of classification, followed by a description in detail of the form of occurrence of useful minerals and ores as shown in the following outline list:

Iron, chromium, aluminum, manganese, nickel and cobalt.
Copper, zinc, cadmium.
Tin, mercury, antimony and arsenic.
Lead and silver-lead ores.
Silver, gold, platinum and "the platinum metals."
Molybdenum, vanadium, uranium and tungsten—their compounds, properties and uses.
Coal, coke, asphalt, Utahite, ozocerite petroleum and natural gas.
Building and fictile materials—granite, sandstone, tufas, limestone, cements, gypsum, clays, marble, onyx and other ornamental stones.
Abrasives and gems, including emery, corundum, diamonds and garnet.
Soluble salts; as salt, nitre, borax, natron and Thenardite.

Lectures illustrated by ores and specimens from the museum, by maps and sections of mines, drawings and original notes and descriptions of the most important mineral deposits and mines of North America; especially of the Comstock and other lodes in Nevada; of the copper mines in Arizona, including the United Verde, Copper Queen, and others; the gold mines of the Appalachians, California, Alaska and Arizona, including the mines of Tombstone, Congress, Pearce and Fortuna, the Cananea copper mines and other mines in Mexico. Text-book, Kemp's Ore Deposits of the United States. Open to Seniors and special students who have taken chemistry, mineralogy and geology 1. Five hours, second semester. [4]

MECHANIC ARTS

PROFESSOR HOLMES

The mechanic arts courses comprise the elements of drawing and shop work. The work consists of lectures, recitations, drawing and tool and machine work. The courses are designed with special regard for the needs of the students in engineering.

MECHANIC ARTS 1. (a) Free hand lettering, one month; Reinhardt's slanting and upright styles; titles and tabulated data. (b) Mechanical drafting, one month; care and use of instruments; Reinhardt's "Technic of Mechanical Drafting"; geometrical construction; tracing; blue printing. (c) Descriptive geometry, Church's seventeen problems on lines and planes, two months. Required of students in Engineering. Five hours, or an equivalent, first semester. [4]

MECHANIC ARTS 2. (a) Forging, one month; properties of iron and steel, methods of manufacture; care of fire; use of forging tools; tool-making and tempering. (b) Bench work in wood, two months; characteristics and properties of wood; care and use of wood-working tools; principles of joinery. (c) Wood turning, one month; care and use of wood lathe and tools; application of wood turning in pattern making. Five hours, or an equivalent, second semester. [4]

MECHANIC ARTS 3, 4. (a) Bench work in iron, one month; wrought and cast iron; use of hammer, file, chisel, and scraper. (b) Machine work in iron, two months; use of engine lathe in turning, boring and thread cutting; drilling machine. (c) Planing and milling machines, one month; special study of comparative efficiency of each in producing similar work. Required of engineering students. Open to students who have taken Mechanic Arts 1, 2. Two hours, or an equivalent, both semesters. [4]

MECHANIC ARTS 5, 6. Descriptive Geometry; this course is a continuation of Mechanic Arts 1. Church's Descriptive Geometry is the text-book used. The work covers shade, shadow and perspective. Required of engineering students. Open to all students who have taken Mechanic Arts 1, 2. Two hours, or an equivalent, both semesters. [4]

NOTE—Graphical Statics and Kinematics are taught in connection with the engineering courses.

ENGINEERING

PROFESSOR WOODWARD, PROFESSOR SMITH

The courses offered under this head are selected with reference to the local conditions and the needs of the Territory. While they are made as technical as is possible without sacrificing in other directions, yet the fact is constantly borne in mind that engineering practice changes from year to year, and that a graduate who is thoroughly grounded in the principles of his profession will readily acquire the technical side. The former is necessary; the latter desirable.

ENGINEERING 1, 2. SURVEYING—Use and care of instruments, including plain and solar compasses, levels, transits; plane land surveying; United States system of land surveys; city, topographical and mine surveying; earthwork computations; determination of azimuth, latitude, longitude and time by observations on the circum-polar stars and on the sun. One full half-day each week is devoted to field practice; plots are made of field surveys and a topographic map of some area in the vicinity of Tucson is executed by each student. Lectures, recitations, drawing and field work. Text-book, Raymond's Surveying. Open to students who have taken Trigonometry. Three hours both semesters and Saturday forenoons. [8] (Smith.)

ENGINEERING 3. MINE ENGINEERING—Prospecting; exploratory workings; boring with percussion and diamond drills; hand and machine rock drills; explosives; blasting, laying out of workings; timbering; methods of winning the ore; hoisting and hoisting engines; underground transportation; mine ventilation. Text-book, Ihlseng's Manual of Mining supplemented by lectures. A portion of the time is devoted to drawing engineering structures such as shaft timbering and steel headframes. Open to students who have taken, or are taking, Mathematics 5, 6. Four hours first semester. [4] (Smith.)

ENGINEERING 4. RAILROAD ENGINEERING—Preliminary and location surveys; simple and easement curves; turnouts and switches; principles of economic location as based upon cost of construction, operating expenses; alignment and grades; maintenance-of-way. The field work consists of the surveys for a line of railroad of sufficient length to secure familiarity with the methods of actual practice. Each student makes a complete set of notes, maps, profiles, calculations and estimates of cost. Open to students who have taken Engineering 1, 2. Four hours until April, two hours and Saturdays through April and May. [4] (Smith.)

ENGINEERING 5, 6. (a) Materials of construction, one-third year; their properties, preparation, and use; stone, brick, lime, cement, concrete, timber, iron and steel. (b) Engineering construction one-third year; masonry construction; dams, retaining walls, bridge abutments and piers, arches; graphical investigation of stability; pile foundations; caissons. (c) Hydraulics one-third year; velocity and discharge from orifices, weirs, tubes, and pipes; flow in sewers, ditches, canals, and rivers; energy of a jet; measurement of water power; water wheels of various types. Text-book, Merriman's

Hydraulics. Lectures, recitations and laboratory work. Open to students who have taken Mathematics 5, 6. Four hours both semesters. [8] (Smith.)

ENGINEERING 7. STATICS—A treatment of the subject by both analytic and graphic methods. Text-book, Johnson's Statics. Prerequisite, Physics 1. Two hours, one of which is a drawing-room conference. [2]

ENGINEERING 9. KINEMATICS OF MACHINERY—Text-book, Jones' Machine Design, Vol. I. The time will be spent largely in the drawing room. Prerequisite Mechanic Arts 4. Two hours, one of which is a drawing room conference. [2]

ENGINEERING 8. THERMODYNAMICS—Lectures and recitations covering the theory of the steam engine, and the production and use of compressed air. Prerequisites, Mathematics 5 and Physics 1. Two hours [2]

ENGINEERING 10. STEAM ENGINES AND BOILERS—A descriptive course with drawing room work, visits of inspection, and tests. Prerequisites, Mathematics 6, Engineering 8, 9. Two hours. [2]

ENGINEERING 11. PRINCIPLES OF IRRIGATION—A study of the present condition of irrigation development in the United States; irrigation legislation; methods of establishing rights to water; a brief reference to the engineering principles relating to the construction and maintenance of canals and reservoirs and the various means of diverting and measuring water for use in irrigation. Prerequisite, Engineering 2. One hour. [1] (Woodward.)

The value of the engineering courses, especially in designing, is enhanced by a collection of blue-prints of actual constructions. The University is indebted to Fraser & Chalmers of Chicago and the Union Iron Works of San Francisco for gifts of blue-prints of mining machinery, including roasters, smelters, converters, hoisting frames and engines, and stamp mills.

The Cambria Steel Company of Johnstown, Pa., has recently presented to the institution a collection of the different grades of iron and steel, giving all the chemical and physical data regarding each, and also a series of samples, each six inches long, of structural steel shapes.

MINING EXCURSIONS

In connection with the courses in Engineering 3, Metallurgy 1, 2, and Mineralogy, two trips will be made to mining districts of Arizona and Sonora, one in December and one in March. These trips are required of all candidates for the degree of B. S. in Mining.

The purposes of these trips is to afford the mining students an opportunity for close study and inspection of mining and metallurgical plants, and of rock formations and minerals of commercial value. The students are accompanied by two professors, and every effort is made to make the trips of the greatest practical value. The visits are carefully scheduled, and notes, with sketches, measurements and photographs are taken, and elaborated into a comprehensive report by each student after the return. These trips are of incalculable assistance to the lecture, text-book and draughting room work.

The subjects of special consideration are transportation, both above and below the surface, mine surveying, methods of stoping and timbering, the best treatment for each ore, assaying and furnace charges, smelting practices, concentration of low grade ores, power generation, pumping and water supply, and mill construction.

During 1903-04 the mining districts of Tombstone, Bisbee, and Cananea, and the metallurgical plants at Douglas were visited in this way. The thanks of the University are due to the superintendents of the various plants visited for their efforts and care in acquainting the students with the works under their management. Special thanks are also due to Supt. H. J. Simmons and Col. Epes Randolph for free transportation over the E. P. & S. W. R. R. and the C. R. Y. & P. R. R.

PUBLIC SPEAKING

INSTRUCTOR GORBY

The object of these courses is to give instruction and training in the principles of expression. Special attention is paid to developing the voice, to strengthening all the powers of the voice and body and to bringing these powers into perfect harmony, that the student may adequately express his ideas. The training is to afford means for general culture, to induce more careful study of and a deeper insight into the meaning and purpose of the great masters of literature.

PUBLIC SPEAKING 1, 2—Study of the philosophy of expression, analysis of voice, quality, force, stress, pitch, besides thorough training in the art and practice of extempore speaking. Text-book, Fulton and Trueblood's Practical Elocution. Two hours both semesters. [3]

PUBLIC SPEAKING 3, 4. ADVANCED COURSE—Analysis and interpretation of higher forms of literature. Study of great orators and their productions. Preparation and delivery of original orations. To achieve the best results a student must have a knowledge of rhetoric, logic, psychology and English literature. Lectures and class drill. Open to Juniors and Seniors who have completed Public Speaking 1, 2. Two hours, both semesters. [3]

NOTE—Students may obtain an additional unit of credit for work in Public Speaking by making special arrangements with the instructor.

PHYSICAL CULTURE

DIRECTOR O. A. KATES

This department is organized to supply the opportunity for such physical work as experience has shown to be necessary under modern conditions, to counteract the deleterious effects of close application to mental work and to favor the attainment by the student body of a high state of physical efficiency.

The work is organized under these heads.

(a) HYGENIC: To aid function, to develop form, to correct undeveloped or deformed parts, to supply recreation.

(b) EDUCATIONAL: To perfect nervous control, to develop physical courage, to gain mental and moral self control, to develop muscular strength and endurance.

In order that these needs may be adequately supplied a complete variety of work, hygienic, recreative, corrective, and competitive, is offered in regularly organized classes in calesthenics, gymnastics and athletics. Advanced classes will, when warrantably desired, be organized, in all gymnastic and athletic specialties.

REQUIREMENTS

Class work in Physical Culture is required of all preparatory students, and of freshmen, two periods per week.

PHYSICAL EXAMINATION

It is intended that a thorough physical examination, including an examination of the eyes, heart and lungs, shall preface the work of every student in physical culture. This examination will be made as soon as possible after the student enters the University and at intervals during his or her course for safety and for determining the results of the work. On the basis of information gained from these examinations, suggestions for work and advice on health topics will be given each individual. Anthropometric cards and charts are platted for students when desired.

In special cases the University reserves the right to require a complete physical examination by a designated physician at the expense of the student.

ATHLETICS

In addition to the regular class drill a certain part of which consists of training and contests in athletic sports, the University is represented by teams in football, baseball, track and field, tennis, basketball, basquette, hand-ball, and indoor-gymnsium work. No student is allowed to become a member of an Athletic team who is seriously deficient in his studies.

Every facility is provided for track and field athletics. The field on the campus contains gridiron, baseball diamond, tennis and basket-ball courts, sprinting path, jumping and vaulting pits.

WOMEN'S DEPARTMENT

The course consists of systematic exercises for the harmonious development of the entire body, besides a course for the development of grace of movement and the production of symmetry of physique. Class drills are usually carried on to music and the value of fancy steps and dancing is appreciated. Special corrective machinery is supplied for this department, so that even the weakest student may be given proper and healthful exercise. The course includes gymnastic nomenclature, applied Delsarte, calesthenics, fancy marching, and the use of regular gymnasium apparatus.

Those pursuing this course are required to provide themselves with a gymnasium suit, consisting of a blouse-waist and divided skirt with the regulation gymnasium shoes. The suit requires four yards of double width, 54-in. dark blue serge. The waist has a sailor collar trimmed with white braid. The Butterick pattern may be used or ready-made suits may be had at the Gymnasium for $3.75.

MEN'S DEPARTMENT

The plan of this department is three-fold: general graded class work, corrective work and elective athletic work. The athletic work is taken in combination with the class work in order that the student by this combination may obtain the best possible devolpment. The corrective work is given under special supervision to all those who are in need of special development, and, also, to those who are unable to do the regular class work.

The decision of the Director upon the examination of the men will be either:

1. Advisory, indicating what course of hygiene and exercise will best sustain and improve the health of the student, or
2. Mandatory, requiring the students to pursue the course of hygiene, and physical exercise necessary for the proper care of health and the discharge of their duties as students.

The students doing work in the Gymnasium are required to wear the regulation gymnasium shoes and suit. The average cost of this suit is about $3.75.

MILITARY SCIENCE AND TACTICS

CAPTAIN MAXON

PRACTICAL COURSE—Exercises on the drill ground covering (a) Infantry exercises in the schools of the soldier, company and battalion; extended order movements, target practice, reviews and parades. (b) Military signaling with flag; telegraphy. Required of all able-bodied male students throughout the Freshman and Sophomore years, except that students who have satisfactorily completed four years of drill at the end of Freshman year may be excused from further work in the department. Elective during the remainder of the course. Juniors who elect this course may receive credit to the extent of two units. Three hours both semesters.

THEORETICAL COURSE—Recitations covering the infantry drill regulations with lectures on military law, discipline, military history, and allied topics. Required of all commissioned and non-commissioned officers. Two hours.

Students claiming exemption from drill will be required to secure a certificate of disability from a physician designated by the faculty unless the disability is apparent. Those so excused will be required to elect a subject in place of this course.

The officers will be appointed from an eligible list determined by examination, both scholarship and class standing being taken into account.

Each member of the military organization will be required to provide himself with the required uniform within six weeks after his entrance. A deposit covering the cost of the uniform should be made upon registration. The uniform consists of cap, coat and trousers of cadet gray cloth trimmed with black braid and closely resembles the undress uniform of the United States Military Academy at West Point.

SHORT COURSE OF INSTRUCTION IN MINERALOGY AND ASSAYING

In order to meet the needs of persons who desire to learn the art of assaying the common ores and who have not the time required for a full four years' course of study the Board of Regents has approved a short course of instruction in practical assaying, mineralogy, metallurgy, and allied subjects.

This course commences with the first semester in each year and requires at least two years; students are advised, however, to take the regular course in engineering and mining, if possible, since in two years they cannot expect more than to make a beginning in these subjects.

REQUIREMENTS FOR ADMISSION

Those desiring to take this course are required to be at least eighteen years of age, to have good health, and to have a knowledge of English, physics and algebra to quadratics, sufficient to enable them to pursue the course with advantage. This knowledge will be tested by examinations.

The fees and tuition are the same as for other departments. (See p. 20.) Each student is required to pay the cost of materials, glassware, and apparatus used by him. For this purpose a deposit of ten dollars will be required in advance each semester and any balance will be refunded.

The right is reserved to vary this course acording to the aptitudes or necessities of those concerned.

FIRST YEAR

General chemistry, one semester.
Qualitative analysis, one semester.
Mathematics, two semesters.
English or Spanish, two semesters.
Practical free-hand drawing and shopwork, or physics, two semesters.

SECOND YEAR

Mineralogy and blow-pipe analysis, two semesters.
Assaying, one semester.
Qualitative analysis and wet assaying, one semester.
Mathematics, two semesters.
Geology, two semesters.

TEXT-BOOKS

The following text-books and others are used:

Chemistry—Remsen, Eliot & Storer, Fresenius.

Assaying—Ricketts, Brown, Furman, Aaron.

Mineralogy—Dana; Brush, Determinative Mineralogy, revised by Penfield.

Geology—Dana, LeConte, Giekie; Kemp, Ore Deposits.

ARIZONA SCHOOL OF MINES

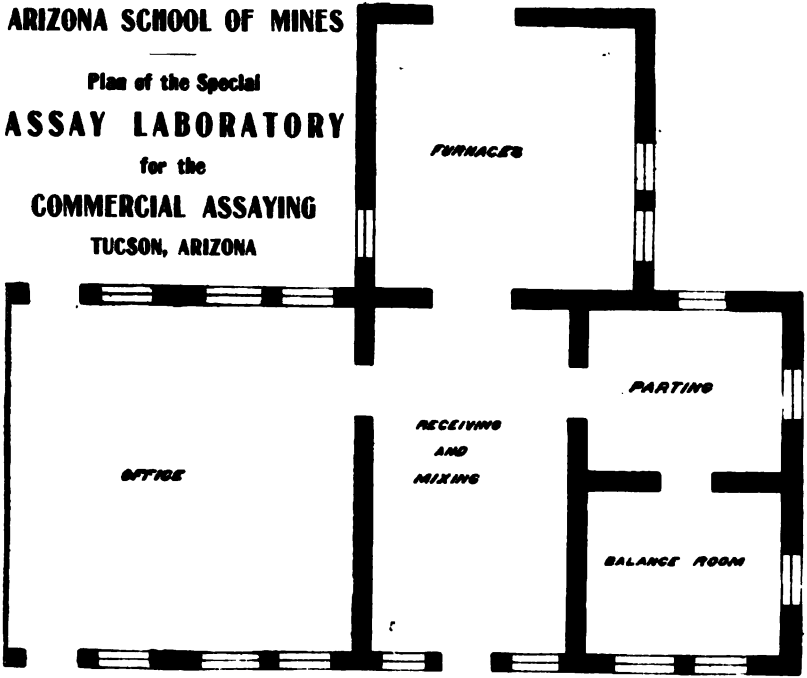
Plan of the Special

ASSAY LABORATORY

for the

COMMERCIAL ASSAYING

TUCSON, ARIZONA



BUREAU OF MINES AND ASSAYING

A separate department of the School of Mines, under the name of "The Bureau of Mines and Assaying" has been established to receive and work ores, and to make assays and analyses of ores, minerals, mineral waters and petroleum.

In accordance with the act of the Legislature of the Territory, approved March, 1897, and amended in March, 1899, assays of ores and minerals are made for the prospectors and miners of Arizona, and for others, at fixed rates established by the law, and tabulated below. To meet the requirements of this work a special laboratory building of brick has been erected and mintained. It is fitted up as a complete assay office, and is provided with a double large brick coke-furnace, a melting furnace and gasoline furnaces in a fire-proof room. There are in addition, a parting and wet assay room, a balance room, and office, as shown upon the accompanying plan.

Extreme accuracy and excellence of work are considered of more importance than pecuniary profits. All assays are made in duplicate and if not accordant are repeated. A special expert assayer is employed, and the assays are not made by students, who receive their instruction in the regular laboratories of the University.

The money received for assaying is deposited monthly to the credit of the assay fund which is used to pay the assayer and the cost of materials and apparatus.

SCHEDULE OF RATES

In accordance with the Legislative enactment approved March 3, 1899, the rates for assaying heretofore in force under the law of 1897, have been changed. The fifty-cent rate is no longer in force. Former circulars and schedules of rates are revoked and withdrawn. Under the provisions of the new law, the Regents of the University of Arizona have established the following rates for assaying ores taken from deposits and mines in the Territory of Arizona:

ASSAYING ORES FROM ARIZONA

Silver and Gold, or either	$1.00
Silver, Gold and Copper	2.00
Copper	1.00
Lead	1.00
Zinc	1.00
Iron	1.00
Gold, Silver, Copper and Lead	2.50
Gold, Silver, Copper and Iron	2.50
Gold, Silver, Copper and Zinc	2.50

The following rates have been established by the Board of Regents for assaying ores taken from deposits or mines withoutt he Territory of Arizona:

ASSAYING ORES FROM WITHOUT THE LIMITS OF ARIZONA

Silver and Gold, or either alone	$1.00
Copper	1.00
Lead	1.00
Zinc	2.50
Iron	2.00
Silica	1.50
Alumina	5.00

And for other determinations and analytical work such rate as the Director of the School of Mines may in each instance fix.

PAYMENT IN ADVANCE REQUIRED

The Director is required, in all cases, to hold the assay until the fee or charge therefor is paid. Remittances may be made by check or money order; or the money, securely wrapped, may be sent with the sample.

RATES FOR SAMPLING AND WORKING ORES

Lots of 100 pounds or less, including assays of three metals	$ 5.00
Each additional 100 pounds, to 500 pounds	1.00
Over 500 pounds, to 1 ton	10.00
Each additional ton	4.00
Ordinary stamp mill test and plate amalgamation for first ton or fraction of a ton	20.00
From 1 to 2 tons	30.00
Pan amalgamation, including crushing and assays, ton	20.00

Large lots proportionately less; small lots more in proportion.

CYANIDE PROCESS

The School of Mines is prepared to make experimental tests of ores and tailings by the cyanide process, in large or small quantities, at rates to be agreed upon with the Director.

Working tests and experiments by other processes may be undertaken at rates to be agreed upon in each instance, depending upon the amount of materials, time and labor required.

CONCENTRATING (INCLUDING ALL ASSAYS)

Wet or dry test of small lot (under 500 pounds	$15.00
500 pounds to 1 ton	20.00
Each additional ton	7.00

GRATUITOUS QUALITATIVE TESTS

The determination of the nature of rare and peculiar minerals, not requiring a chemical analysis, or an assay, is made gratuitously. Samples sent for this purpose should be in their original condition as broken out, and not crushed to a powder or pulp. Tests requiring determination of the presence of gold or silver must be paid for at assay rates. Samples may be sent by mail at the rate of one cent per ounce. They should be distinctly labeled inside the package with the name of the sender, and a letter should be posted at the same time giving the full name and address, and inclosing a stamp for the reply. This offer of free examination is intended to apply to minerals unknown to the sender and does not cover special tests for precious metals or for any metal the presence of which is usually determined by an assay.

BULLION ASSAYS

Special attention is given to the retorting and melting of bullion and the assays of gold bars for shipment.

ANALYSIS OF WATER

The Bureau in co-operation with the chemists of the Agricultural Experiment Station, is prepared to undertake the analysis of ordinary or mineral waters.

HOW TO SEND SAMPLES

For small samples, under four pounds in weight, the most expeditious and cheapest way is to send by the ordinary mail. The express company does not deliver parcels at the University, hence delay often results from sending by express. Delays also result from the want of identification. Sometimes the only clue to the name of the sender is the comparison of the handwriting upon the sample and that upon the letter. The postal laws permit the name of the sender to be written and inclosed in the package. Each sample should be labeled by a slip of paper, inside, giving the name and locality of the claim and the name of the sender.

The name of the claim is desired in order that the value and distribution of the mineral wealth of the territory may be better known.

Special rates for freight on consignments to the "Director of the School of Mines," are granted by the Southern Pacific railroad from points in Arizona. Ask the agent at shipping point for particulars.

All business communications, checks and money orders should be addressed to the

ARIZONA SCHOOL OF MINES,
WM. P. BLAKE, Director.
Tucson, Pima Co., Arizona.

THE AGRICULTURAL EXPERIMENT STATION

STATION STAFF

THE PRESIDENT OF THE UNIVERSITY	
R. H. FORBES, M. S.	Director and Chemist
A. J. McCLATCHIE, A. M.,	Agriculturist and Horticulturist
T. F. McCONNELL,	Animal Husbandman
JOHN J. THORNBER, A. M.,	Botanist
W. W. SKINNER, M. S.,	Associate Chemist
T. D. A. COCKERELL,	Consulting Entomologist
S. M. WOODWARD, A. M.,	Consulting Meteorologist
E. G. LEE,	Clerk

ORGANIZATION AND WORK

The Agricultural Experiment Station is a legally constituted department of the University, whose purpose is "to aid in acquiring and diffusing * * * useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and application of agricultural science."

With the above objects in view, the organization of the Station includes the departments of administration, agriculture and horticulture, animal husbandry, botany and chemistry, the whole or a major portion of the time of one or more members of the Station staff being devoted to each department of the Station work. Provision is made for meteorlogical and entomological work also, though to a less degree.

Owing to the wide variation in agricultural conditions in Arizona, it has been found of advantage to distribute the work so that each department is located, so far as possible, in the situation most favorable to the accomplishment of its own special results. According to this principle, the various lines of Experiment Station work have been distributed as follows.

The Director's office and the departments of botany and chemistry are maintained at Tucson in the University buildings. Through this arrangement, the Experiment Station profits by the buildings and libraries of the University, while the University is benefited from time to time by the teaching ability of members of the Station Staff. It has been found that from this base of operations the three great agricultural districts of the Territory—Salt River Valley, the lower Colorado, and the upper Gila—are accessible with equal convenience for field work and observations.

On the same grounds—fitness of location for the work undertaken—the Experiment Station farm has been maintained and strengthened at Phoenix. Salt River Valley is intermediate in elevation, in situation, and in mean yearly temperature between the other two important farming districts above mentioned, and for this reason the agricultural and horticultural results obtained there are capable of the most general application in the Territory at large.

On the same principle again, the date palm orchard is located in the alkaline district south of Tempe, where a successful demonstration of this palm as a commercial fruit producer will be of the greatest value, creating use for great areas of alkaline land in the arid Southwest.

The range station also, for the study of worn-out range country with a view to its reclamation to usefulness, is located in a typical district near Tucson, and is conducted under the auspices of the department of botany, co-operating with the United States Department of Agriculture.

The services of specialists in various subjects, such as entomology, meteorology, and soil survey work have also been secured from time to time.

The results of the Experiment Station work are made public at frequent intervals in the bulletins and reports of the Station. These publications are made in two series: first, the longer and more technical bulletins, stating in considerable detail the investigations as they mature, and secondly, the "Timely Hints for Farmers," which are brief writings issued at the time when they will be most useful, written in plain language, and presented in popular form. The annual reports also are for the most part written popularly, and afford a convenient and reliable summary of each year's work as it comes to completion.

The Experiment Station work conducted and published on the lines indicated above has a two-fold value. In the first place, the suggestions made or derived from the investigations of the Station are of direct material profit to the agricultural public and are intended to be immediately applied to advantage in the betterment of agricultural practice. In the second place, these writings are intended to serve an educational purpose, inasmuch as they are so presented as to constitute lesson sheets for the benefit of the careful reader. It may therefore be considered that the Experiment Station reaches a class of some thirty-five hundred readers in the Southwest at frequent intervals by means of its "Timely Hints" and other publications. The operations of the range study tract at Tucson, the Experiment Station farm at Phoenix, the date palm orchard at Tempe, and the sugar beet plots on the upper Gila serve also as an object lesson to the adjacent public.

It is believed that this distributed and mobile organization is especially effective, not only for the purpose of the

Experiment Station, but also for those of the University as well, since it allows the Station to conduct its work in localities suitable for the accomplishment of results; and again, it causes the public to become better acquainted with the Territorial University, of which the Station is a department.

An appropriation of eleven thousand dollars, made for the use of the Station by the Twenty-second Legislature, very satisfactorily attests the estimation in which the work of the Station is held. This appropriation is intended for the improvement of the date orchard, for purchasing livestock and buildings for the farm, and for issuing publications and holding farmers' institutes and short courses of instruction throughout the Territory.

Provision, therefore, is made for the symmetrical development of this work in the Territory, both experimentally and educationally; and, prospectively, "the farmers' college" bids fair to increase in usefulness to the growing agricultural interests of the Territory.

SUB-COLLEGIATE DEPARTMENT

INSTRUCTORS

KENDRIC CHARLES BABCOCK, Ph. D., President.
SHERMAN MELVILLE WOODWARD, A. M., Geometry.
DAVID HULL HOLMES, B. S., Shopwork and Drawing.
GEORGE EDSON PHILIP SMITH, B. S., C. E., Physics.
JOHN JAMES THORNBER, A. M., Botany, Biology.
FAUST CHARLES DeWALSH, A. B., French, German, Spanish.
HATTIE FERRIN, B. S., English, Latin.
MABEL GRAY HOOVER,, Domestic Science.
MARION CUMMINGS STANLEY, B. A., Latin, English.
JOHN WILLIAM GORBY, M. A., Public Speaking, Greek, English.
ALICE OLIVIA BUTTERFIELD, B. A., Physical Culture, History.
BENJAMIN FRANKLIN STACEY, B. A., B. D., Science.
GEORGE MARK EVANS, LL. B., Mathematics.
JOHN W. PROUT, JR., Chemistry.
ELBERT JOHN HOLLINGSHEAD, Bookkeeping, Civics, Commercial Law.
ANNA BEARD, Stenography, Typewriting.

GENERAL INFORMATION

In this department the University offers the work of a well-organized High School, with the added advantages of shopwork and drawing and of domestic science. The general library and the gymnasium are open to all students in this department.

The equipment of the scientific laboratories is available for use in this sub-collegiate work, whenever it can be used advantageously, and makes possible strong work in elementary science. The instructors in this department are assisted by the professors of the college department, several of whom regularly conduct sub-collegiate classes. By reference to the course of study which follows, it will be seen that it offers a comprehensive training for those who may not be able to pursue their studies farther, while it gives a good preparation for college.

ADMISSION

Admission to regular standing in the first year of the sub-collegiate course presupposes the completion of the work of the eighth grade of the public or parochial schools. Students who do not bring certificates showing the completion of this work, must take examination to test their ability to pursue profitably the work of the first year.

ALL STUDENTS ENTERING THE PREPARATORY DEPARTMENT WILL BE REQUIRED TO TAKE AN EXAMINATION IN ORAL READING. To remedy notable deficiency in this subject, the University will require extra work in addition to other studies.

In all cases in which the preparation of a student in a particular subject has been insufficient, the University reserves the right to require the student to secure at his own expense the help of an approved coach until the insufficiency is remedied.

COURSE OF STUDY

The following course of study will be required of all students who fit themselves at the University for entrance to the Freshman class in 1904. Such variations from it will be made during the next year as will adapt it to the case of students already in the sub-collegiate department.

Military drill or physical culture is required of all able-bodied students throughout the course. The young men have drill three times per week and exercise in the Gymnasium twice. The young women have physical culture.

The language begun in the second or third year must be pursued for at least two years in order to secure credit toward graduation.

While the subjects are for convenience grouped by years in the following schedule, yet the departmental method will be followed. In the description of courses following, the subjects are arranged by groups or departments in the consecutive order in which they are taken up and students will be required to take them in this order. Aside from this sequence the ability of each student must determine what subjects are pursued at any given time, due regard being given to the proper balance of subjects. The wishes of parents will always be given careful consideration in making up the schedule of work for each student, but the final decision in the matter must rest with the committee on registration, which is composed of persons who have had long experience in secondary and collegiate teaching. Individual attention will be given to the needs of each student.

To each student who completes the studies of this course, a certificate stating that fact will be given, which certificate will entitle the holder to admittance to the University courses of instruction without examination.

FIRST YEAR

English	5	Physical Geography	3
Algebra	5	Drawing and Shopwork or Domestic Science	5
Greek and Roman History	2		

SECOND YEAR

English	5	*Drawing and Shopwork or Domestic Science	5
Algebra	5	*German (first year)	5
General History	4	*French “	5
*Bookkeeping	5	*Spanish “	5
*Latin	5		

THIRD YEAR

English	5	*French, first year	5
Plane Geometry	5	“ second year	4
*Chemistry	5	*German, first year	5
*Drawing and Shopwork	5	“ second year	4
*Latin	4	*Spanish, first year	5
*Greek	5	“ second year	4
*Stenography	5	*Public Speaking	2

FOURTH YEAR

English	5	*Greek	4
Civics	3	*French (second year)	4
Physiology	2	*German “	4
*Solid Geometry and Algebra	4	*Spanish “	4
*Physics	5	*Public Speaking	2
*Latin	4	*Parliamentary Practice	1
		*English History	4

Numerals indicate number of recitations per week. Subjects marked * are elective. One elective must be chosen in the second year; two in the third year, and two in the fourth year.

PUBLIC SPEAKING

A course of one year in laws of health, respiration, voice culture, articulation, orthoepy, physiology of the voice, cure of faults of voice and manner; gesture, rendition, emphasis, grace, deportment. Various styles of recitations committed to memory by each student for delivery before the class. Text-book, McIlvaine's Elocution.

HISTORY

The aim of all the work in history is to lead the pupil to see the development of races and nations along political, social and religious lines, and to arouse in him a love for the subject and a habit of broad and discriminate reading.

The work of the first year will consist of a survey of the development and characteristics of the Greek and Roman civilizations. A text such as Wolfson's or West's will be supplemented by collateral reading and a notebook.

The work of the second year includes mediaeval and modern history. The aim is to give the student an idea of the essential unity of history and the leading facts in the political development of races and nations. Adams's European History is used supplemented by the reading of references contained therein.

Hinsdale's American Government is the text-book in civics. The historical development of the subject is made prominent while practical problems, such as taxation and municipal government, are made the subjects of special investigation and study.

Coman and Kendall's or Larned's History of England is used as the text-book in the fourth year.

LATIN, GREEK, FRENCH, SPANISH AND GERMAN

For an outline of the courses in Latin and Greek see page 22, under requirements for admission.

For an outline of the courses in French, Spanish and German see pages 31 and 32.

MECHANIC ARTS

This work consists of both drawing and shop work, between which subjects the student's time is about equally divided. The course covers three years and is designed to furnish a thorough elementary knowledge of Manual Training as taught in the sub-collegiate schools of the country.

FIRST YEAR. Drawing—Freehand sketching in perspective and orthographic projection. Reinhart's lettering, freehand working drawings.

Shopwork—"Sloyd" including wood-carving, care and use of wood-working tools.

SECOND YEAR. Drawing—Mechanical drawing, geometrical problems, first seventeen problems in Church's descriptive geometry.

Shipwork—Forging, joinery, wood-turning.

DOMESTIC SCIENCE

The course in domestic science is arranged to give instruction in the science and art of home economics, and to raise home making to a higher plane. In includes all branches of home science, hygiene, chemistry of cooking and cleaning, preparation of all food stuffs, both fancy and elementary, nursing and food for the sick, marketing, management of servants.

Two courses are offered in sewing. The first year includes fancy needle work, and the second year drafting, cutting and dressmaking. Social duties and customs of society are considered with particular care. The students have access in the domestic science library to all the best authorities.

BOOKKEEPING, STENOGRAPHY AND TYPEWRITING

Bookkeeping is taught by the modern budget system. The work is individual and each student may progress as fast as his time and ability permit. The course is thorough in all the details of office practice. The course includes instruction in commercial law. A complete course in stenography is offered, the Pitman system being used. The department is equipped with Remington typewriters.

Special students in bookkeeping and stenography will not be received. All students taking these courses must show proficiency in English and English composition, represented by the English work of the year of the course preceding the year in which the elective is offered.

PARLIAMENTARY PRACTICE AND DEBATE

The two higher classes in the sub-collegiate department devote one period of each week to work in parliamentary practice and debate. The classes are organized under a regular constitution and by-laws. Instruction is given in parliamentary law, Roberts's Rules or Order being used as a text-book. The members are required to introduce resolutions and prepare debates upon them. They are also given practice in performing the duties of secretary and in presiding in the meetings.

SCIENCE

It is the object of the courses in science to initiate the student into the processes and methods used in laboratory work; to teach close observation, careful manipulation and logical deduction; to acquaint the student with the fundamental facts of the various branches of science and to give full practice in the use of good English in describing various observations and experiments. To insure better results in the notebooks, they will all be passed upon by one of the instructors in English.

PHYSICAL GEOGRAPHY. This course, combining the laboratory method with the text-book, aims to give the pupils training in exact observation of familiar phenomena, like distance, weight, pressure of liquids and gases, temperatures, winds, clouds and the habits of plants and animals. The natural forces producing erosion, formation of soils and rocks, the processes of nature as seen in seed germination and plant growth (with demonstrations with the microscope) will be discussed, with frequent experiments and field excursions.

CHEMISTRY. A year's work with the text and in the laboratory.

PHYSICS. A thorough course consisting of three recitation periods and four laboratory periods per week, carried on along the lines laid down for the senior year in secondary schools.

PHYSIOLOGY. This course aims to combine careful laboratory instruction, with application of the knowledge to practical personal hygiene. This work will be co-ordinated with that of the department of Physical Culture. For part of the instructions the young men and women will meet in separate sections.

MATHEMATICS

In algebra special attention is given to the transition from arithmetic to algebra, to the fundamental operations and especially to factoring. The course includes as much as is found in any good text-book of algebra through quadratic equations.

Plane geometry occupies one year. This is so taught as to develop orderly habits of thinking and of investigation. To that end much original work is required, including practical problems involving the application of the principles learned.

ENGLISH

The English of the sub-collegiate course is based upon what are known as the entrance requirements of New England colleges. The work is in general divided into three parts: classics, studied in class, composition and grammar work done partly in class and part outside, and supplementary reading done largely outside the class-room. All these parts of the work may be carried on at the same time, as the circumstances of the class seem to require, the classics and supplementary reading forming the basis of a large part of the work in grammar and composition. Throughout the course, however, a primary aim is to develop the student's individual power of expressing himself in words. The time allotted to these three phases of English varies from year to year, increasing attention being paid to the appreciative and critical faculty as the course advances. In the fourth year a brief outline history of English and American literature occupies about one-third of the year's work in English.

The four years' sub-collegiate English is conducted under the following general outline. Five hours each week are given to English throughout the course.

FIRST YEAR

CLASSICS. Ivanhoe, Lady of the Lake, Silas Marner or Palmer's Odyssey. These are for general reading, though discussed in class, and made the basis of written tests.

COMPOSITION AND GRAMMAR. Text-books, Scott & Denney, Elementary Composition and a grammar to be chosen by the teacher, both to be used for two years. This work may be carried on through some part of each recitation period, with the classics above as a basis so far as is desirable. The aim is to make the grammar organic but not mechanical.

SUPPLEMENTARY READING. Gayley's Classic Myths, Old Mortality, Rob Roy, Tales of a Wayside Inn, Waverly, Last of the Mohicans, Tom Brown at Rugby, Marmion. These selections may be used in class and worked upon there, or read at home as occasion requires.

SECOND YEAR

CLASSICS. Vision of Sir Launfal, Ancient Mariner, Idylls of the King, studied as in first year.

COMPOSITION AND GRAMMAR. As in first year with attention to figures of speech, reproducing the work of classic authors, elementary etymology, exercises in exposition, narration and description.

SUPPLEMENTARY READING. Deserted Village, Lorna Doone, selections from Burroughs.

THIRD YEAR

CLASSICS. (a) Julius Caesar, Merchant of Venice. Princess, Sir Roger de Coverley, Poems of Burns, Carlyle's Essay on Burns. These are for general reading as in first and second years. (b) Macaulay's Essay on Milton, Milton's l'Allegro, Il Penseroso, Comus, Lycidas. These are for careful study, attention being given to the author and his times, the circumstances surrounding each composition, the references and allusions, the text, the style and the personality of the author, the intellectual and artistic features of each production, and such other problems as arise in a thorough consideration of a piece of literature.

COMPOSITION AND GRAMMAR. Text-book, Scott and Denney's Composition-Rhetoric. Special attention given to elementary argumentation and to exposition. Grammar in review as occasion requires.

SUPPLEMENTARY READING. Sesame and Lilies, Backlog Studies, Treasure Island, Kidnapped.

FOURTH YEAR

CLASSICS. Burke's Speech on Conciliation, Macaulay's Essay on Addison, Macbeth. These are all for thorough study as under (b) of previous year.

COMPOSITION AND GRAMMAR. Exercises in narration and description for flexibility and ease of expression and general preparation for entrance requirement "b" on page 23 of this Register.

HISTORY OF ENGLISH LITERATURE. From the earliest times, with text-book as guide, with a review in chronological order of the classics studied during the four years of the course, to prepare for examination in entrance requirement "a" on page 22 of this Register. Special attention is paid to Keats, Shelley, Tennyson and other representative poets of the nineteenth century.

SUPPLEMENTARY READING. Our Old Home, Making of an American, Newcomes, Oliver Twist, American Orations and Addresses.

MILITARY ORGANIZATION 1903-04

UNIVERSITY OF ARIZONA CADET BATTALION

National Guard of Arizona

Commandant of Cadets	Captain Mason M. Maxon, U. S. A.; Major N. G. A.

STAFF

Adjutant	First Lieutenant Roy B. Kilgore
Quartermaster	Second Lieutenant Francis D. Crable
Unassigned	Captain Bard L. Cosgrove
Sergeant Major	Ygnacio S. Bonillas

COMPANY A

Captain	Roy W. Moore
First Lieutenant	J. Wesley Gebb
Second Lieutenant	W. Stanley Gebb
First Sergeant	Albert A. Johns
Sergeant	John H. Zellweger
Sergeant	Albert R. Buehman
Corporal	W. James Pew
Corporal	W. Scott Osborn

COMPANY B

Captain	Oliver Scow
First Lieutenant	Fred H. Bernard
Second Lieutenant	Sheldon L. Ijams
First Sergeant	Owen F. Jones
Sergeant	J. Elmer Johnson
Corporal	Wm. F. Drew
Corporal	Hugh M. Wolflin
Corporal	George C. Marsh

BAND

Chief Musician	Frank C. Kelton
Drum Major	Charles E. Wooddell
Corporal	Burrell R. Hatcher
Corporal	Manuel Montijo, Jr.
Private	P. E. Baffert
Private	Roy L. Cornell

Private	**Emmet F. Ford**
Private	**J. A. Gamble**
Private	**W. A. Grossetta**
Private	**L. M. Holliday**
Private	**C. L. Hardy**
Private	**L. F. Hazzard**
Private	**B. G. Suarez**
Private	**C. E. Thomas**
Private	**A. A. Trippel**

ALUMNI ASSOCIATION

The Alumni Association of the University of Arizona was organized on the second day of June, 1897.

The object of this society as expressed in its constitution is: "To promote the interests of the University, to secure unity among its graduates and to foster an attachment to our Alma Mater."

Concerning the last two clauses of this declaration it may be said that the organization is carrying out their meaning in a manner which leaves little if anything to be desired. There is no doubt regarding the loyalty of the graduates to the University of Arizona and no question of their unanimous desire for the prosperity of the institution.

The first clause of the above declaration, however, deals with a matter which in a sense admits of more growth than those just mentioned, and the members of the association realize that there is room for further progress in the accomplishment of this purpose.

In the past the alumni organization has been small in numbers and efforts to "promote the interests of the University" have necessarily been somewhat feeble. As, however, the membership is now fairly large and will be considerably augmented in 1903 it is the conviction of the alumni that the time has come for more clearly defined and decisive work in behalf of our Alma Mater.

So far the activity of the society has been shown in two ways: First by assuming charge of the work of securing suitably framed photographs of the members of the graduating classes, from year to year, and presenting these to the University for preservation on its walls, thus forming a pictorial record of the work of the institution. Secondly, by giving an annual banquet at Commencement to the graduates and members of the faculty, thereby creating a fraternal feeling between the old and new members of the association and also keeping the instructors and graduates in touch with each other from year to year. However commendable and important these enterprises may be it is the belief of the society that now with numerous members scattered throughout Arizona actively engaged in the industries, arts and sciences the time has come to take up additional work.

The members of the association realize that there are yet many people in the Territory who are not fully aware of the educational opportunities afforded by the University. Some of these are sending their children to other States to receive an education which might be obtained equally well in this Territory. It should be realized that the more the people patronize their own institution the better will become the courses which it can offer. In one sense the degree of development of the University depends only on the measure of support given to it by the citizens of the Territory.

Another feature which is commended to the careful consideration of our wealthy citizens is that the University of Arizona has not one cent of endowment. Through the generosity of one of the largest mining companies in Arizona the institution has received two substantial gifts of money to aid in the erection and furnishing of buildings, but other than this nothing has been received from private individuals. Institutions to the east and west of us have endowments of thousands of dollars; why should not the University of Arizona be endowed also?

In pursuance of the foregoing lines of thought it will be the aim of the alumni association to endeavor to create a deeper feeling of interest and pride in the University of Arizona among the people of the Territory.

ALUMNI OF UNIVERSITY OF ARIZONA

1895

Charles Oma Rouse, B. S., Cashier Southern Pacific Railroad Company, Tucson, Arizona.

Mercedes Anna Shibell, B. S., (Mrs. A. J. Gould), Tucson, Arizona.

Mary Flint Walker, B. S., (Mrs. Pearl Adams), Benson, Arizona.

1897

Edward Marshall Boggs, C. E., (nunc pro tunc) Chief Engineer Ooakland Electric Railways, Oakland, Cal.

Clara Cramond Fish, B. S., Teacher, Flagstaff, Arizona.

George Ojeda Hilzinger, B. S., Teller in Bank, El Paso, Texas.

Mark Walker, B. S., Metallurgist, Tombstone, Arizona.

1898

Hattie Ferrin, B. S., Instructor in University of Arizona, Tucson, Arizona.

Granville Malcolm Gillett, B. S., Draughtsman in Surveyor General's Office, Phoenix, Arizona.

Minnie Watts, B. S., (Mrs. W. B. Smith), Altaville, Cal.

*John Desha Young, B. S.

1899

Robert L. Morton, B. S., Assayer, Yuma, Arizona.

---

* Died April 8, 1899.

1900

Ida Clarissa Flood, B. S., (Mrs. G. Dodge) Oakland, Cal.

Samuel Pressly McCrea, B. S., A. B., Principal of High School, Mountain View, California.

Charles Pierce Richmond, B. S., Cyanide Manager, San Salvador, Central America.

Florence Russel Welles, B. S., (Mrs. Wm. Angus), Tucson, Arizona.

1901

Rudolph Castenada, B. S., Surveyor, Benson, Arizona.

Clara Ferrin, B. S., Teacher, Tucson, Arizona.

George Millard Parker, B. S., Denver, Colo.

David Hull Holmes, B. S., (nunc pro tunc) Professor of Mechanic Arts and Drawing, University of Arizona, Tucson, Arizona.

1902

Andrew Gilbert Aiken, A. B., B. S., Surveyor, Canton, New York.

Moses Blumenkranz, B. S., Asst. Supt. Shannon Copper Company, Metcalf, Arizona.

Ruth Brown, Ph. B., Teacher, Tucson, Arizona.

Felix Grundy Haynes, B. S., Casa Grande, Arizona.

Rosa Belle Barrott, Ph. B., Teacher, Roseburg, Oregon.

Philip Matthew Reilly, B. S., Assayer, La Cananea, Sonora, Mexico.

Bertram L. Smith, B. S., Surveyor and Assayer, Mayer, Arizona.

Bessie Smith, Ph. B., Teacher, Tucson, Arizona.

Walter James Wakefield, Assayer, Tombstone, Arizona.

1903

Richard Lamar Drane, B. S., Draughtsman, Tucson, Arizona.

George Mark Evans, LL. B., Ph. B., Instructor in University of Arizona, Tucson, Arizona.

Leslie Alexander Gillett, B. S. (Mining), Draughtsman, in Surveyor General's Office, Phoenix, Arizona.

Georgia Ann Holmesley, Ph. B., Tempe, Arizona.

Edward Horton Jones, B. S., Assayer, Magdalena, Sonora, Mexico.

John Williard Prout, Jr., B. S., Instructor in University of Arizona, Tucson, Arizona.

Thomas Edward Steele, B. S. Assayer, Cananea, Sonora. Mexico.

DEGREES CONFERRED 1903

DOCTOR OF LAWS

Hon. William Herring.

MASTER OF ARTS

John William Gorby, A. B.
Benjamin Franklin Stacey, A. B., B. D.

BACHELOR OF PHILOSOPHY

George Mark Evans, LL. B.
Georgia Ann Holmesley.

BACHELOR OF SCIENCE

Richard Lamar Drane.
Edward Horton Jones.
John Williard Prout, Jr.
Thomas Edward Steele.

BACHELOR OF SCIENCE IN MINING

Leslie Alexander Gillett.

REGISTER OF STUDENTS.

1903-04.

POST GRADUATE STUDENTS.

Evans, George Mark, (Ph. B. University of Arizona) Mathematics, History and Science	Tucson.
Ferrin, Clara, (B. S. University of Arizona) History	Tucson.
Ferrin, Hattie, (B. S. University of Arizona) French and German	Tucson.
Flood, Ida Clarissa, (B. S. University of Arizona) History,	Tucson.
Prout, Jr., John Williard (B. S. University of Arizona) Mathematics and Chemistry	Denver, Colo.

SENIORS—4.

Alexander, William Burnham	Scituate, Mass.
Hollingshead, Elbert John,	Tucson.
Kelton, Frank Caleb,	St. Albans, Vt.
Prout, Estella Markham,	Denver, Colo.

JUNIORS—7.

Ball, Charles Leonard,	Santa Monica, Cal.
Ganz, Sylvan Cleveland,	Phoenix.
Gebb, John Wesley,	Jerome.
Holman, James Pattison,	Seattle, Wash.
Norway, Ora Elinor,	Tucson.
Reid, Ida Christina,	Tucson.
Rockwell, Guy Lionel,	Compton, Cal.

SOPHOMORES—18.

Alexander, Charles,	Lee's Summit, Mo.
Bernard, Fred Horton,	Tucson.
Brostrom, William Walter,	Tucson.
Chapin, Theodore,	Tucson.
Colton, Georgiana,	Safford.
Day, Courtland Francis,	Duncan.
Jacobson, Robert Clarke,	Tucson.
Kilgore, Roy Bartley,	Williams.
MacIntyre, John Malcolm,	Phoenix.

Marshall, Thomas K.,	Tucson.
Moore, Bert,	Santa Barbara, Cal.
Moore, Kirke Tonner,	Tucson.
Moore, Nino,	Tucson.
Moore, Roy Webb,	Tucson.
Rosenberg, Leo M.,	Phoenix.
Thornber, Harriet B.,	Tucson.
Whipple, William Dominicus	Clifton.
Wooddell, Minnie Louise,	Tucson.

FRESHMEN—27

Adams, Charles Henry,	Williams.
Anderegg, Charles,	Tucson.
Babcock, Frances Myra,	Tucson.
Bonillas, Ygnacio Safford,	Nogales, Mexico.
Brown, Harriet Estella	Tucson.
Brown, Thomas Bruen	Los Angeles, Cal.
Cornell, Roy LeGrande	Corona, Cal.
Crable, Francis Drake	Tombstone.
Fish, Florence May,	Tucson.
Gardenier, Lela,	Oneonta, N. Y.
Gebb, William Stanley	Jerome.
Ijams, Sheldon	Safford.
Marsh, George Claire,	Phoenix.
Miller Clarence Ethelbert,	Lincoln, Ill.
Morfoot, Charles Roy,	Bisbee.
Nelson, Ada M.,	Chicago, Ill.
Osborn, Winfield Scott,	Phoenix.
Purcell, Weeda Ina,	Tucson.
Redd, Paul Chester,	Tucson.
Samuels, Kathryn,	Tucson.
Schmid, Arnold,	Bisbee.
Schoenle, Robert Wolfgang,	Seattle, Wash.
Scow, Oliver,	Dos Cabezos.
White, Charles,	Dos Cabezos.
Wolflin, Hugh Maupin,	Tucson.
Willson, Martha Edna,	Newark, O.
Zellweger, Elsie Marie,	Tucson.

SUB-COLLEGIATE—FOURTH—7

Bernard, Allan Chouteau,	Tucson.
Bradford, Hubert,	Aberdeen, O.
Cole, Leah Margaret,	Tucson.
Fitch, Constance,	Tucson.
Jones, Ernest,	Tucson.
Pickett, Ernest Charles,	Napa, Cal.
Wooddell, Charles Edward,	Tucson.

SUB-COLLEGIATE—THIRD—27

Bernard, Nonie C.,	Tucson.
Brown, Clara Agnes,	Tucson.
Brown, John Stephenson,	Tucson.
Buehman, Albert Rex,	Tucson.
Cole, Rena Anne,	Tucson.
Cully, Edith E.,	Tucson.
Davis, Hattie Louise,	Fairbanks.
Drew, William F.,	Mesa.
Francis, Mae A.,	Tucson.
Gamble, James Albert,	Solomonville.
Gamble, William Edward,	Solomonville.
Hatcher, Burrell R.,	Douglas.
Holladay, Elsie Roxanne,	Tucson.
Johnson, Joel Elmer,	Mesa.
Jones, Owen Frank,	Buckeye.
Kane, Mae Dolores,	Tucson.
McInernay, Alice Georgia,	Tucson.
Marsh, Elinor K.,	Norwich, N. Y.
Maxon, Kimball W.,	Waukesha, Wis.
O'Connell, Thomas S.,	San Francisco, Cal.
Pease, Ione Gertrude,	Tucson.
Pew, William James,	Mesa.
Scholefield, Walter,	Tucson.
Stewart, Jesse H.,	Mesa.
Thomas, Charles Emerson,	Tucson.
Woods, Mary Etta,	Tucson.
Zellweger, John H.,	Tucson.

SUB-COLLEGIATE—SECOND—34

Angius, Dan,	Bisbee.
Bemis, Francis George,	Sanger, Cal.
Brown, Charles Owen,	Tucson.
Carpenter, Leslie L.,	Tucson.
Childs, Ruby C.,	Chicago, Ill.
Doan, Fletcher M.,	Tucson.
Dunn, Edward,	San Francisco, Cal.
Erb, Amy Myrtle,	Yorktown, Tex.
Evans, Evalyn Mayme	Tucson.
Fike, Lyman W.,	Naco.
Grosetta, Warren Arthur,	Tucson.
Guerry, Horace Dixon,	Tucson.
Halderman, Ada E.,	Dragoon.
Harney, Leah Maude,	Butte, Montana.
Hazzard, Lynne Franklin,	Tucson.
Hoeffer, Philip H.,	Hermosillo, Mex.
Johns, Albert Arthur,	Prescott.
Lewis, Otis David,	Lothrop, Mont.
Macomb, Philip Livingston,	Ft Huachuca.
Martin, Andrew P.,	Tucson.
Mansfeld, Monte,	Tucson.
Moore, Sylvester Archie,	Congress.
Redd, Waldron Russell,	Tucson.
Reed, Sheldon Alanson,	Tucson.
Rodgers, Pauline,	Tucson.
Samuels, Agnes H.,	Tucson.
Scholefield, Helen Mar,	Tucson.
Steinfeld, Harold D.,	Tucson.
Suarez, Benito Guadalupe,	Solomonville.
Tonella, Carlos,	Hermosillo, Mex.
Trippell, Alfred Alexander,	Tucson.
Whalley, Mable Elizabeth,	Tucson.
Winchester, Wilbur Theodore,	Tucson.
Wright, William E.,	Tucson.

SUB-COLLEGIATE—FIRST—61

Adams, Lee David,	Dragoon.
Akins, Susie,	Mesa.

Angius, John,	Bisbee.
Baffert, Peter E.,	Tucson.
Bell, Sylvester D.,	Tucson.
Bernard, Edwin Price,	Tucson.
Cassiday, Clifford Harry,	Tucson.
Cole, Myrtle Elsie,	Tucson.
Coleman, Mabel May	Tucson.
Contraman, Robert William,	Tucson.
Dannemiller, Raymond Charles	McCabe.
Detloff, Albert John,	Bisbee.
Donnelly, Albert Francis,	Tucson.
Drachman, Myrtle Augustine,	Tucson.
Duffy, Mary Margaret,	Tucson.
Elliott, Irene Anabelle	Tucson.
Estabrook, Ethylind M.,	Tucson.
Estes, Lee,	Willcox.
Fike, Homer R.,	Naco.
Ford, Emmet T.,	Tucson.
Francis, Daisy E.,	Tucson.
Gast, William H.,	Tucson.
Goldtree, Estella,	Tucson.
Gorby, Eva,	Marietta, O.
Gregory, Minnie Hortense,	Tucson.
Hardy, Charles Lyttle,	Tucson.
Harmon, Ernest Frank,	Washington.
Hoeffer, Albert H.,	Hermosillo, Mex.
Holliday, Leonidas Maurice,	Tucson.
Hoyt, Joseph Clyde,	Jerome.
Katzenstein, Albert Samuel,	Tucson.
Leslie, Beppie Lee,	Tucson.
McKay, William,	Cochise.
McLean, John William,	Metcalf.
Macomb, Alexander,	Ft. Huachuca.
Millar, Leslie Creighton,	Tucson.
Montijo Jr., Manuel,	Tucson.
Ochoa, Edna,	Tucson.
Odermatt, Tessie A.,	Tucson.
Palafox, Leopoldo,	Matape, Mex.
Platt, Maude,	Safford.
Potter, Delbert Dorsey,	Clifton.
Purcell, Ivy,	Tucson.

Rebeil, Bernardo, ---------- Tucson.
Roberts, Roy Percival, ---------- Washington.
Rose, Bert Edward, ---------- La Cananea, Mex.
Rose, Frank Winfred, ---------- Young.
Rose, Fred E., ---------- La Cananea, Mex.
Rowley, Daisy, ---------- Gila Bend.
Serventi, Henry B., ---------- Tucson.
Soldini, Amelia Bernice, ---------- Tucson.
Sparks Leona M., ---------- Tucson.
Strong, Leon H., ---------- Tucson.
Stansbury, Herbert Earl, ---------- Marshes, W. Va.
Stutz, Charles M., ---------- Jerome.
Tomlinson, Edward L., ---------- Prescott.
Tonkin, Ruth Anna, ---------- Tucson.
Varney, Earling A., ---------- Tucson.
Wheeler, Charles Allan, ---------- Tucson.
Wheeler, Winifred, ---------- Tucson.
Zent, Leonard, ---------- Naco.

UNCLASSIFIED—15

Angus, William,—Mathematics.......... Tucson.
Bogan, Mrs. Phebe M.,—English, French and Spanish.......... Tucson.
Butterfield, Alice Olivia,—Domestic Science.......... Phoenix.
Cosgrove, Bard L.,—Science.......... Chicago, Ill.
Feldman, Mabel,—Bookkeeping.......... Tucson.
Griffith, Cora,—Spanish.......... Tucson.
Hadsell, Walter Elias,—Mathematics and Science.......... Buckeye.
Judell, Dr. Malvine I.,—French and Spanish...... San Francisco, Cal.
Merriman, Lurena,—History.......... Tucson.
Millington, Hugh,—English and Science.......... Tucson.
Peck, Mrs. F. J.,—Spanish and German.......... Oakland, Cal.
Pusch, Gertrude,—Spanish and German.......... Tucson.
Rhodes, Emma D.,—Domestic Science.......... Frankfort, Kan.
Russell, Ross Moody,—English, Science and Sociology....... Phoenix.
Skinner, Mrs. G. M.,—Domestic Science and Spanish.......... Tucson.

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1904-1905

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1905-1906

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REGISTER

OF THE

UNIVERSITY OF ARIZONA

FOURTEENTH YEAR

1904-1905

ANNOUNCEMENTS

1905-1906

TUCSON, ARIZONA
F. E. A. KIMBALL, Printer
1905

CALENDAR.

1905.

Sept. 14,	Thursday	Entrance Examinations.
Sept. 15,	Friday	
Sept. 18,	Monday	Registration Day.
Sept. 19,	Tuesday	First Semester begins.
Nov. 22,	Wednesday	Thanksgiving Recess begins
Nov. 27,	Monday	Instruction resumed.
Dec. 22,	Friday	Holiday Recess begins.

1906.

Jan. 2,	Tuesday	Instruction resumed.
Feb. 1,	Thursday	First Semester ends.
Feb. 2,	Friday	Arbor Day: Anniversary of the University.
Feb. 5,	Monday	Second Semester begins.
June 3,	Sunday	Baccalaureate Discourse.
June 4,	Monday	Exhibition Military Dept.
June 5,	Tuesday	Exhibition Mechanic Arts Department.
June 6,	Wednesday.	Commencement.

BOARD OF REGENTS.

Ex-Officio.

HON. JOSEPH H. KIBBEY..Phoenix
Governor of the Territory.

HON. NELSON G. LAYTON..Phoenix
Superintendent of Public Instruction.

Appointed by the Governor.

WALTER TALBOT..Phoenix
Chancellor.

GEORGE J. ROSKRUGE..Tucson
Secretary.

MERRILL P. FREEMAN..Tucson
Treasurer.

CHARLES H. BAYLESS, A. M.,..Tucson

FACULTY.

KENDRIC CHARLES BABCOCK, Ph. D.
B. L., 1889, Minnesota; A. M., 1895, Harvard; Ph. D., 1896, Harvard.
President, Professor of History. 1903*.

WILLIAM PHIPPS BLAKE, A. M.
Ph. B., 1852. Yale; A. M., Dartmouth.
Professor of Geology, and Mining; Director School of Mines. 1895.†

HOWARD JUDSON HALL, A. M.
B. S., 1890, Michigan (Agricultural); A. B., Stanford; A. M., 1900.
Professor of English; Dean of the Faculty. [On leave till September 1, 1905.] 1891.

ROBERT HUMPHREY FORBES. M. S.
B. S., 1892, M. S., 1895, University of Illinois.
Director and Chemist Agricultural Experiment Station. 1894.

FRANK NELSON GUILD, M. S.
B. S., 1894, M. S., 1903, Vermont.
Professor of Chemistry and Mineralogy. 1897.

DAVID HULL HOLMES, B. S.
1892-1894, Washington University; B. S., as of 1901, Arizona.
Professor of Mechanic Arts and Drawing. 1898.

GEORGE EDSON PHILIP SMITH, C. E.
B. S. 1897; C. E., 1899, Vermont,
Professor of Physics and Engineering. 1900.

JOHN J. THORNBER, A. M.
B. S., South Dakota [Agricultural]; B. S., 1897, A. M., 1901, Nebraska.
Professor of Biology; Botanist, Agricultural Experiment Station. 1901.

IVAN DELASHMUTT, B. S.
B. S., 1901, California.
Professor of Metallurgy. 1904.

---

*Dates following titles indicate appointment to service in the University.

†Prof. Emeritus after September, 1905.

VERNON A CLARK, B. S.
B. S., 1898, Vermont.
Professor of Agriculture and Horticulture, Agricultural Experiment Station. [Residence, Phoenix.] 1904.

SAMUEL VICTOR McCLURE,
First Lieutenant, U. S. A., 1896, West Point.
Professor of Military Science and Tactics. 1904.

EDWIN MORTIMER BLAKE, Ph. D.
Mining Engineer, 1890, Ph. D., 1893, Columbia.
Professor of Mathematics and Mechanics. 1904.

SIDNEY CARLETON NEWSOM, A. M.
A. B., 1895, Harvard; A. M., 1898, Chicago.
Assistant Professor of English. 1904.

ORIN ALBERT KATES,
Assistant Professor of Physical Training Director of the Gymnasium and Athletics. 1904.

CHARLES ALFRED TURRELL, A. M.
B. S., 1896, Nebraska; A. M., 1901, Missouri.
Assistant Professor of Modern Languages. 1904.

HENRY B. SLADE, A. B.
A. B., 1895, Brown University.
Associate Chemist, Agricultural Experiment Station. 1904.

MABEL GRAY HOOVER,
Graduate Oread School of Domestic Science.
Instructor in Domestic Science. 1901.

HATTIE FERRIN, B. S.
B. S., 1898, Arizona.
Instructor in English and Latin. 1901.

MARION CUMMINGS STANLEY, B. L.
B. L., 1900, California.
Instructor in Latin and Philosophy. 1902.

GEORGE MARK EVANS, LL. B.
LL. B., 1904, Michigan; Ph. B., 1903, Arizona.
Instructor in Mathematics. 1902.

JOHN WILLIAM GORBY, A. M.
A. B., 1901, Marietta, A. M., 1903, Arizona.
Instructor in Public Speaking and Greek. 1902.

GLENN A. WILCOX, B. S.
B. S., 1893, Cornell.
Instructor in Science. 1904.

WILLIAM M. RUTHRAUFF,
A. B., 1902, Wittenburg.
Instructor in Economics and History. 1904.

ESTELLE G. LUTRELL, A. B.
A. B., 1896, Chicago.
Instructor in English; Librarian. 1904.

FREDERICK EDWIN TALMAGE, B. S.
B. S., 1903, California.
Instructor in Stenography and Book-keeping. 1904.

WILLIAM ANGUS,
Instructor in Mathematics. 1904.

OTHER OFFICERS.

FREDERICK EDWIN TALMAGE, B. S.
Secretary to the President. 1904.

HERBERT BROWN,
Curator Territorial Museum.

MRS. CORNELIA M. STEWART,
Preceptress of Young Women. 1903.

MRS. MARY HENRY AITON, M. D..
M. D. Northwestern.
Medical Examiner for Young Women. 1904.

ORIN ALBERT KATES,
Head of Men's Dormitory. 1904.

JOHN WILLIAM LEWIS,
Secretary to the Director of the Agricultural Experiment Station.

ROBERT A. HARRIS,
Superintendent of Buildings and Machinery. 1904.

WILLIAM W. BROSTROM,
Commercial Assayer. 1904.

STUDENT ASSISTANTS.

[Service not continuous through the year in every case.]

O. ELLINOR NORWAY,
RALPH BATEMAN,
J. THOMAS MEEK,
S. ARCHIE MOORE,
WILLIAM JAMES PEW,
JESSE H. STEWART,
GUY EMMONS,
W. SCOTT OSBORN,
WALTER MELLGREN,
J. CLYDE HOYT,
MARTHA WILSON,
ANITA POST,
FRANCES M. BABCOCK,
NORMAN A. ROSE
BURRELL A. HATCHER.

STANDING COMMITTEES.

1904-1905.

The President is ex-officio member of all committees.

EXECUTIVE.

Professors W. P. Blake, Forbes, Holmes, E. M. Blake.

REGISTRATION AND CLASSIFICATION.

Professors Guild, Smith, Newsom, DeLashmutt.

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Professors Smith, Newsom, Kates.

LIBRARY.

Professors Guild, Smith, Turrell, Miss Lutrell.

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Professor Holmes, Mr. Gorby, Miss Ferrin, Mrs. Stanley.

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Professors Thornber, Newsom, Mr. Gorby, Mr. Ruthrauff,

MANUAL TRAINING

Professors Holmes, Smith, Miss Hoover.

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Mr. Evans, Prof. Holmes, Miss Ferrin, Mr. Talmage.

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Professors Guild, Thornber, Mr. Evans.

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Professor Newsom, Mr. Wilcox, Mrs. Stanley.

RHODES SCHOLARSHIPS.

President Babcock, Professors Newsom, Guild.

UNIVERSITY OF ARIZONA

Established By Act of the Legislative Assembly, 1885; Opened to Students, October, 1891

PURPOSE AND ORGANIZATION.

The University of Arizona is a part of the system of public education established for the Territory, and aims to fill, as head of such system, the same position as that occupied in the States by the State Universities. In general, the organization of the University is in accordance with the Morrill Act of 1862, creating the Land Grant Colleges. The United States has already set apart fifty-seven sections of valuable public land in the northern timber belt, to which the University will receive full title upon the admission of the Territory into the Union. In creating the University, the Legislative Assembly wisely unified under one management the various schools and institutions of higher learning or investigation, which in some States and Territories have been widely and completely separated—the colleges of liberal culture, the schools of Mines and Engineering, the Agricultural College, and the Agricultural Experiment Station. No professional schools of law, medicine, arts or music have yet been organized. On the other hand, while the high schools of the Territory are in the formative period, the desire to make the University serviceable to all, has led to the establishment and maintenance of a sub-collegiate department.

The purpose of the University of Arizona is in the language of the organic law, "to provide the inhabitants of this Territory with the means of acquiring a thorough knowledge of the various branches of literature, science and the arts;" and so far as possible a technical education adapted to the development of the peculiar resources of Arizona. In furtherance of this latter purpose, instruction is provided especially in agriculture, in the mechanic arts, and in mining and metallurgy. The University, by the nature of its situation, frankly lays its strongest emphasis upon the course in mining engineering. It is in reality in a great mining laboratory surrounded as it is on all sides by great mines. Some of these mines developed on a large scale are within a few miles of the city and the number and magnitude of such enterprises is steadily increasing. Probably no University in the United States offers such fine advantages to the students of mining engineering who desire to see the actual operation of great mines, or the development of new enterprises, while carrying on the theoretical and experimental work of the mining course.

The Agricultural Experiment Station, a department of the University, is wholly engaged in investigating and developing the agricultural resources of the Territory.

The government of the University is vested in a corporation styled The Board of Regents of the University of Arizona, consisting of the Governor of the Territory and the Superintendent of Public Instruction, ex-officio, and four other members appointed by the Governor.

LOCATION AND CLIMATE.

The University of Arizona is located at Tucson, one of the largest towns in the Territory, on the main line of the Southern Pacific railway, 312 miles west of El Paso, Texas, and 500 miles east of Los Angeles, Cal. The town lies in a broad, flat valley at an elevation of

2,400 feet above sea level and is surrounded by mountains. Its dry, mild and equable climate has made Tucson a famous winter resort unsurpassed for healthfulness.

The winter climate is especially good; the temperature is cool and strengthening but not severe, the lowest temperature recorded during the average year being about twenty degrees above zero, Fahrenheit. Little rain falls during the winter; fogs are all but unknown; cloudy days are rare. The percentage of sunshine throughout the winter is greater than that recorded at any other place in the United States. Owing to the extreme dryness of the air the highest temperatures known are less oppressive to the senses and less dangerous to the health than the summer heat of the upper Mississippi Valley States. The total amount of rainfall averages less than twelve inches.

The University campus consisting of fifty-five acres is situated upon high ground about a mile from the business center of the city with which it is connected by a street-car line. On every side it commands a view of mountain scenery of remarkable extent and grandeur. The buildings are lighted by electricity furnished by the city plant.

An abundant supply of unusually good water for household, laboratory and irrigation purposes is drawn from a large well on the Campus from a depth of one hundred and twenty feet.

The grounds have been carefully laid out in drives, lawns and gardens. A large number of palm, olive, umbrella, ash, pepper, bagote and cottonwood trees give the Campus quite the air of a park.

BUILDINGS.

The main building, University Hall, is 200x105 feet, two stories in height, the first story of gray stone, the second of red brick, and is completely surrounded by a wide two-story veranda. The building contains recitation rooms, laboratories and apparatus rooms of the various departments, an assembly room, and the office and library of the Experiment Station.

The Library and Museum building, costing about $32,000 including furnishings, was occupied in January, 1905. It is a handsome red brick and Bedford sandstone building, with a massive tile roof. The interior finish is in natural oak and pine. The offices of the President and Secretary of the University are on the first floor. The Library reading room is on the second floor, a large, well-lighted room, beautifully furnished with heavy solid oak reading tables, desks and wall cases. The stack-room at the rear is fitted up with the most modern steel stacks. The Museum occupies part of the first floor and the west half of the second floor. Large additions in the shape of new oak and plate glass cases have been made to the furnishings. Six rooms on the first floor remain unfinished. An appropriation of $2,000 has been made for the completion of the building, and the work will be done before September, 1905.

North Hall, a dormitory two stories in height built of gray stone of fine quality, is occupied by the young women. Besides the parlor and rooms of the preceptresss, it contains sixteen rooms, each large enough to accommodate two students, During the summer of 1905 the building will be entirely refurnished by means of money appropriated by the Legislative Assembly.

South Hall, a large brick building containing forty rooms, with bath and toilet rooms is the men's dormitory, capable of accommodating seventy-five students.

The Dining Hall, built of red brick and well equipped, provides ample boarding accommodation for all persons living on the Campus.

The Shop and Assay building is a large substantial brick structure. It contains a commodious drawing room for mechanical and free-hand drawing, a large laboratory for forge work, machine practice and carpentry. Two other rooms are used for lockers, and for the motor and engine. The commercial assaying department occupies a number of rooms fully equipped with a large melting furnace, the necessary muffle furnaces, and other accessories for making complete and accurate assays.

The Mill or Mining Machinery building located to the northeast of the main group of buildings, is a plain wooden structure in which are placed the stamp-mill, jigs, concentrating tables, separators, etc., constituting the mining laboratory.

Herring Hall, the Gymnasium, is a very substantial high red brick building, 40x80 feet. It was constructed in 1903, the gift of Professor James Douglas and his associates of the Copper Queen Consolidated Mining Company, through Colonel William Herring after whom it was named.

Three brick residences on the Campus are the homes of the president and professors.

Other buildings are the boiler-house, which also contains the well and pumps whereby the water supply for irrigation and general purposes is obtained; three greenhouses; a propagating-house; the cottage occupied by the classes in domestic science; and a temporary wooden building used for various purposes.

MAINTENANCE.

The University is supported by funds supplied by the United States Government and the Territory of Arizona. By the provisions of the Morrill Act of 1890, the University receives annually from the United States the sum of $25,000 for the College of Agriculture and Mechanic Arts, established in accordance with the Act of July 2, 1862. For the support of the Agricultural Experiment Station the University receives from the same source an annual appropriation of $15,000 by the Act of Congress of 1887, known as the Hatch Act. The Territory of Arizona provides the proceeds of a 3-5 mill tax on the assessed valuation of the property of the Territory, which in 1904 amounted in round numbers to $23,000. Besides these sums, the University receives from year to year by special grants of the Territorial Legislative Assembly, appropriations for specific purposes. Thus $20,000 was voted for the years 1905 and 1906, to be devoted to minor buildings, improvements, repairs, publications, etc.

EQUIPMENT.

LIBRARY.

The library containing 10,000 bound volumes and 12,000 pamphlets, is open to the use of all students. A valuable feature of the library is the collection of complete sets of scientific and literary periodicals, which are of special service in research work.

A complete dictionary card catalogue is maintained.

The reading room is furnished with about seventy scientific, literary and general periodicals, besides the weekly Territorial newspapers.

The Carnegie Library of the city of Tucson is also open to the use of the students of the University. This library is the depositary of United States Government documents for the Territory of Arizona.

MUSEUM.

The Seventeenth Legislative Assembly of Arizona passed an act establishing a general museum at the University. The object of the museum is to collect materials of all kinds illustrating the resources and development of Arizona, and particularly to preserve historical relics, including those pertaining to the aboriginal inhabitants. Donations of specimens and collections will be received and acknowledged with thanks, but no special provision has yet been made by the Legislature for the support of this department aside from a small appropriation for the salary of a curator.

The professors at the University have the immediate care of the collections pertaining to their respective departments. The collections now displayed at the University comprise representative series of minerals, ores and rocks of Arizona. Among these may be particularly mentioned superb specimens from the mines of the Copper Queen at Bisbee. There are also collections of typical rocks and minerals for comparison, and many specimens of ores from different parts of the United States and from abroad. It is desired to make the collection of ores and minerals fully represent the great mineral resources of Arizona.

A large amount has been recently spent upon new cases for the Museum in its new quarters and the material thus re-arranged and displayed in good light becomes doubly attractive and useful.

The museum is indebted to Mr. Herbert Brown, curator, for a large and valuable collection of skins of the birds of Arizona, which he has deposited in the museum, as well as for a collection of ancient aboriginal pottery and other relics. The fossil skull and teeth of an elephant and other fragmentary remains of extinct animals sent from Yuma by Mr. Brown also deserve special mention.

Historical records of much value are gradually accumulating as a part of this museum, and an appeal is made to old settlers and others to bear this fact in mind when making disposition of articles bearing even remote relation to the early pioneers and their history. All records and data of any nature that can be gleaned are worthy of preservation, and it is earnestly desired to have them placed at the University, where they will always be accessible for reference.

BIOLOGY.

The biological laboratories are located on the second floor of University Hall. They are convenient and well-lighted and the equipment is such as is required for modern instruction and research in the biological sciences. The library and apparatus are well selected and adapted to the region and the courses offered.

The collections possessed by this department form a very important part of its equipment. The herbarium consists of 12,000 sheets of mounted plants of which number 2,500 are included in the University botanical survey herbarium. The unique flora and fauna of the mountain, mesa and lowland collecting grounds in close proximity to the institution offer very attractive opportunities for instruction and research especially along ecological lines. The Desert Botanical Laboratory of the

Carnegie Institution supplements in most admirable fashion the facilities of the University for investigation.

In addition to the above there are fifty cases of insects, a large case of seeds, articulate and disarticulate human skeletons, plaster and papier-mache models of the important structures of the human anatomy, and duplicate material for study and dissection.

CHEMISTRY.

The chemical laboratories are two in number. That used by beginners in the study of general chemistry and qualitative analysis is on the second floor of University Hall and is equipped for the experimental and theoretical study of chemical science.

The laboratory for quantitative analysis is on the first floor of University Hall. It is thoroughly equipped for the teaching of volumetric and gasometric analysis, blow-pipe analysis, metallurgical chemistry, and wet and fire assaying, including apparatus for the electrolytic determination of metals.

The balance room contains analytical and bullion balances of the latest model so arranged as to insure a maximum of stability and accuracy. A lecture and demonstration room fitted with sinks, cabinets, etc., completes an equipment of apparatus and collections adequate for first-class instruction in both theoretical and practical chemistry.

The laboratories of the Agricultural Experiment Station occupy three rooms on the first floor, being devoted to analytical work and chemical investigations relating to agriculture. Though not intended for the use of students it is of incidental value to the institution through the investigations which are here conducted.

MINERALOGY.

The laboratory for quantitative analysis is used for determinative mineralogy and blow-pipe analysis. The laboratory is supplied with necessary apparatus for student work including glass and wood models for the study of crystallography, hand and reflecting goniometers for the measurement of the angles of crystals, and a polariscope for the study of the optical properties of minerals and a type set of 600 minerals. Three large cabinets of specimen rocks and 500 microscopic sections of rocks have been recently added to the working collections.

PHYSICS.

Three rooms on the first floor of University Hall are set apart for the teaching of physics. The facilities for experimental demonstration of all important phenomena are very complete. The lecture room is fitted with shutters so that it can be darkened. A beam of sunlight directed by a fine clock heliostat outside may be thrown steadily across the lecture table for experiments on light, or used in connection with the solar lantern for a variety of other work. Adjacent to the lecture room are the laboratory and the apparatus room. Both lecture room and laboratory are supplied with water and gas.

An eight-inch Willyoung induction coil with storage and X-ray accessories is used in the study of high-tension electricity. Through the generosity of the Honorable Mark J. Egan, of Clifton, the University has during this year, by importation from Germany, added to its equipment for the study of electricity a fine set of miniature wireless telegraphy apparatus, capable of transmitting messages about two hundred feet.

This department also has a double dissolving arc-light Ideal stereopticon, which is used by various other departments of the University and for public lectures before the students.

MATHEMATICS.

Models are an important aid to the study of mathematics. The collection of the Department includes thread models of about forty ruled surfaces of the third, fourth and sixth orders. These illustrate the theory of surfaces and are also valuable in the study of kinematics and linkages.

The Bulletin and Transactions of the America Mathematical Society, and the Encyklopadie der Mathematischen Wissenschaften are subscribed for by the University Library.

MINING ENGINEERING AND METALLURGY.

The Mill or Mining laboratory is equipped for use by the students of mining engineering, in connection with their work in testing ores as to their adaptability for treatment by different processes, both on a large and small scale. The chief features of the equipment are one Fraser & Chalmers five-stamp mill, with 900lbs. stamps; one Fraser & Chalmers three-stamp mill, with 250lbs. stamps; one 7x10 Blake crusher; one pair of Cornish rolls; one new 16ft. Wilfley table of the latest design; three amalgamating pans; and a new thirty-horse power, "type C," Westinghouse motor.

There are also automatic samplers, elevators, trommels, two small cyanide plants, amalgamated plates, percolaters for leaching tests, etc. A complete assay and chemical outfit supplements them. The student is able to make the necessary determinations on the spot.

The assay laboratory is equipped with assay furnaces for crucible work, for scorifying and cupeling, and for retorting mercury from amalgam, besides all needed appliances for assaying by dry and wet method including electrolysis. The laboratory also has desks and fittings for the chemical work required in the metallurgical and mineralogical investigation and analysis of ores, and mineral fertilizers and in qualitative tests of minerals.

CIVIL ENGINEERING.

The apparatus in this department has been chosen with a view to giving the student the greatest familiarity with the theory, construction and use of those instruments and machines which observation has shown to be of universal adoption in practical civil engineering work and the allied lines in hydraulic and mining engineering. This apparatus embraces surveyors' and engineers' chains, standard field and pocket tapes; plain solar compasses and transits, mining transits; engineers' levels; stadia, level and transit rods; aneroid barometers; odometer; automatic water-registers, hook-gauges; three forms of current-meter; stop watch; meteorological instruments; drafting instruments; mechanical calculators; blue-print apparatus; a four and one-fourth inch astronomical telescope with equatorial mountings and accessories; celestial sphere; planimeter and calorimeter.

MECHANICAL ENGINEERING.

This department has a drafting and recitation room in addition to the regular drawing room of the department of Mechanic Arts. In this room is the catalogue file containing the trade literature of about five hundred leading machinery manufacturers of the United States; the collection of working drawings consisting of over three hundred blue prints; and the sample collection of models, machine parts, valves, electric fittings, insulating materials, abrasives, etc.

The Mechanical and Electrical Laboratory, which is to occupy a large room in the new Pump House, to be erected during the summer of 1905, will be equipped for study and operation of boilers, steam and gasoline engines, hydraulic and electrical machinery. Besides the machinery of the shop and the mill which can be used for experimental purposes and for study of machine design, the University has a 60 H. P. tubular boiler, 35 H. P. Atlas engine, a duplex feed pump, a Cameron pump, a 3 H. P. and a 1-2 H. P. direct current electric motor, an injector, a 500 gallon fire pump, a 300 gallon two-stage centrifugal pump and its electric motor in the University well.

MECHANIC ARTS.

The Mechanic Arts building provided largely through the generosity of the Copper Queen Consolidated Mining Company, has a total floor area of 7,900 square feet divided as follows: Power room and draughting room each 1,200 square feet; wood-working shop, forge shop and machine shop, each 1,400 square feet; wash room, 600; model room 400, and store room 300 square feet.

Each shop provides working space for twenty-four students at benches or forges and ample space for machines and tool rooms. The draughting room accommodates thirty-six students.

The wood-working shop is equipped with a full assortment of hand tools, four wood turning lathes, a universal wood-worker, a dimension sawing machine and other modern wood working appliances.

The forge room contains twenty-four down-draught forges, twenty-four anvils, a blacksmith drill-press and all necessary small tools.

The power room contains an engine, a new 15-horse-power motor, a blower and exhauster.

The machine shop contains three 14-inch engine lathes, one 24-inch engine lathe, one 16-inch shaper, one 24-inch planer, one 24-inch drill, one universal milling machine, one grinding machine, vices and a complete outfit of small tools.

The entire building is well ventilated and lighted from above as well as from the sides. The draughting room is heated by steam.

AGRICULTURE AND HORTICULTURE.

Because of the situation of the Territorial University the educational work in agriculture and horticulture has taken peculiar form, being largely conducted on the correspondence plan, particularly through the "Timely Hints for Farmers" issued under the auspices of the Experiment Station, but of distinct educational value. Three thousand farmers of the Territory are reached regularly twice a month by timely publications on subjects of vital interest. The Twenty-second Legislature having made provision for a conductor of Farmers' Institutes, announcement will soon be made in regard to this work, which will probably take the form of short courses in agriculture.

Small and well selected agricultural libraries of slight cost have been forwarded to a considerable number who have expressed a willingness to receive them.

It is believed that this method of dealing with our situation will become increasingly useful.

The equipment for agricultural instruction is good, consisting of an excellent seed collection, a green-house and gardens for experimental purposes containing many rare and interesting plants, and a well-selected agricultural library.

GYMNASIUM.

Herring Hall, the new gymnasium, is fully equipped for the purposes of the department of physical training and athletics. The apparatus is of Standard make, and includes forty chestweights, dumb-bells, bar-bells, wands, Indian clubs, a Medart vaulting-horse, parallel-bars, a horizontal bar, a quarter-circle, an abdominal chair, wrestling maching, wrist machine, finger machine, chest expander, chest developer, climbing rope, flying rings, traveling-rings, striking-bag and drum, jump and vaulting stands, fencing foils and masks, basket balls and goals, five large mats and a set of anthropometric apparatus.

In the basement are located ninety-six lockers and five shower-baths which are supplied with hot water from a heater with large reservoir.

In connection with this equipment are the base ball and foot ball field, out-door basket ball court and three fine tennis courts.

MILITARY.

Room O is used as an armory. It is fitted up with the necessary gun racks and accessories. The equipment includes 150 old style Springfield rifles, 100 Springfield cadet rifles with complete accourtrements, eight sabres and belts, one 3-inch muzzle-loading rifle with carriage and complete equipment and necessary musical instruments and signal flags. A large clear area south of the Library building is kept leveled and smoothed for a drill ground and parade ground. At the rear of the Mill building are the targets for short range practice.

GENERAL ORGANIZATIOM.

I. COLLEGE OF AGRICULTURE AND MECHANIC ARTS.

In this College are offered courses leading to the following degrees:

1. Bachelor of Philosophy.
2. Bachelor of Science.
    - a. (General scientific course.)
    - b. In Chemistry.
    - c. In Agriculture.

II. THE SCHOOL OF MINES.

A four-year course leading to the degree of Bachelor of Science in Mining.

A short, two-years' course in mineralogy and assaying.

The Bureau of Mines and commercial assaying.

III. THE AGRICULTURAL EXPERIMENT STATION.

IV. THE SUB-COLLEGIATE DEPARTMENT OF MANUAL TRAINING.

English, scientific and classical subjects.

Manual training and domestic science.

Bookkeeping, stenography and business practice.

COLLEGE OF AGRICULTURE AND MECHANIC ARTS.

The courses offered in the College of Agriculture and the Mechanic Arts provide both a liberal training along literary and scientific lines and technical training along engineering, mechanical and agricultural lines. Great latitude of election is given in the literary and scientific courses, but the courses in engineering are more rigid in their requirements. Full details of the various courses follow. The aim in all is to combine the practical with the theoretical in instruction. The needs of our young and growing commonwealth are kept in mind, and a steady attempt is made to develop the adaptability and resourcefulness so necessary to meet these changing conditions.

ARIZONA SCHOOL OF MINES.

The School of Mines is designed for the education and training of young men in the arts and sciences directly involved in the industries of mining and metallurgy. Especial attention is given to the sciences of mathematics, physics, chemistry, mineralogy, geology and their applications. The two-years course in assaying is designed to prepare students as assayers only. The Bureau of Mines and Assaying, while not directly connected with the work of instruction, affords with its laboratory and the influx of new material, a valuable object lesson to the advanced students of mining and metallurgy.

REGISTRATION.

All students are expected to register on registration day at the beginning of the year and at the beginning of the second semester, in the president's office. Before making choice of elective subjects the student should in every case confer with the instructors concerned and with the committee on registration. A matriculation fee of $5.00 is required of all students upon entering the University. No student will be registered until the matriculation fee has been paid. After this fee is once paid no further fee is required for future registration. After registration no change in classes can be made without the consent of the committee on registration.

Students entering from other institutions should present to the committee certified copies of their records in such schools together with certificates of graduation or of honorable dismissal.

TUITION.

Tuition is free to students from Arizona. For all non-resident students, tuition is $10 for each semester. No reduction will be made for late registration or for early withdrawal.

RECORDS.

The class standing of each student is determined by the instructor in charge. The method of ascertaining the student's record is left to the instructor, and his report in all cases is final.

DISCIPLINE.

The disciplinary policy of the University in all its departments is based upon the assumption that the students are young gentlemen and young ladies, who come to the institution with a high determination to utilize to the full the opportunities offered, and with a keen sense of duty, honor and courtesy to each other and to the faculty. Formal and explicit prohibitions and rules are few, but those will be rigidly enforced, with adequate penalties, and good order and discipline maintained. The University is a civil, rather than a military, community, and such liberty as will not be abused will be allowed all classes of students. In aggravated cases, such as cheating in University work, frequenting saloons, gambling houses, and other objectionable places, and serious breaches of peace or order, the faculty will not hesitate to proceed to the extreme measure of expulsion. In cases of expulsion, the student is required by regulations of the Regents and faculty to leave the campus immediately, and by Territorial statute to surrender his cadet uniform to the University. In all matters of discipline the faculty and President will strive for fairness, equity and efficacy rather than uniformity.

Students or classes desiring to make requests of the faculty should file their petition in the President's office before the hour of faculty meeting; class petitions must be presented at least two days before the time of meeting.

VACATIONS AND HOLIDAYS.

A short recess (see calendar, page 2) is taken at Christmas time. The long summer vacation begins about June first and continues until the middle of September. The Thanksgiving recess extends from the close of the regular exercises on the Wednesday before Thanksgiving to the next Monday morning. During the past two years the cadet companies have made a practice march of from three to five days, which constituted in reality a third vacation. All legal holidays are observed by the cessation of ordinary University work.

Arbor day has been formally adopted by the University Regents as the regular anniversary on which shall be celebrated the founding of the institution, in connection with the ceremonies of tree planting.

LIVING ACCOMMODATIONS.

Provision is made so far as possible for furnishing board and rooms to students of both sexes upon the University grounds. Young men have comfortable quarters in South Hall, the Mens' Dormitory building, which can accommodate about seventy-five students, two in a room. North Hall, the home of the young ladies, is in charge of an experienced and capable preceptress who has constant supervision of those rooming there.

Both dormitories are lighted by electricity. Rooms contain a clothes press, and are provided with single bedsteads, table, chairs, mirror, wash-bowl, pitcher and slop-jar. Students will supply their own mattresses, pillows, sheets, blankets, towels, rugs, brooms and such other articles as they may desire for ornamenting their rooms. They will care for their own rooms under the direction of the head of the dormitory. The Dining Hall of the University has accommodations for one hundred students. It is under the management of a paid steward who is responsible to the President and the Board of Regents. While the charge for board is very low, it is the aim of the management to serve substantial, wholesome, appetizing meals. All students having rooms in the dormitories are required to take their meals at the Dining Hall. Students and members of the faculty, who reside outside the dormitories may board at the Dining Hall.

FEES AND EXPENSES.

	Lowest.	Highest.
Tuition, free to students from Arizona...		
" students non-resident in Arizona, each semester........................	$10.00	$10.00
Matriculation fee, (paid but once).........	5.00	5.00

Maintenance fee (deposit) by students in Mens' Dormitory	3.00	3.00
Maintenance fee (deposit) by male students residing intown	1.00	1.00
Mining excursions, for advanced students,	20.00	40.00
Laboratory and shop fees, varying according to courses, per annum	1.00	30.00
Military uniforms, (for freshmen and sophomores)	16.25	20.00
Books, per annum	5.00	20.00
Board, per month	16.00	20.00
Lights per room, per month	50	1.50
Napkins	50	50

By resolution of the Board of Regents of the University, board is to be paid in advance on the first of each month. Checks, postoffice or express money orders should be made payable to the President. No reduction in the bill for board will be made for absence for a period of less than one week, except by special arrangement at the office.

Text-books may be obtained directly from the publishers through a book association managed on the co-operative plan under the direction of the faculty. Members of the cadet companies will be required to provide themselves with the prescribed uniform, which will be ordered by the University. The cost of the uniform, which must be deposited in advance, during the present year has been $16.25. This uniform has shown better wearing qualities than a civilian suit of equal cost, and parents are urged to consider the matter of uniform when supplying their sons with clothing for the approaching University year It may be worn on all occasions, and thus will remove the necessity for additional expenditure for outer clothing other than overcoats. When the warm weather of spring comes, the students are expected to purchase the regulation khaki uniform and campaign hat, the total expense being about $7.

The University has at present no scholorships or loan funds with which to aid students who must earn their way. Various positions about the grounds, buildings and laboratories of the University, paying from $4 to $20 per month, are filled by students who must be self-supporting. The number, however, is not large, and preference is given to students from Arizona and to those who have spent time enough in the University to demonstrate that they are earnest, capable, reliable young men, likely to do this outside work and at the same time maintain a good record as students.

RAILROAD RATES.

The Southern Pacific, the Maricopa, Phoenix & Salt River Valley, the Santa Fe, Prescott & Phoenix, the El Paso & Southwestern, and the Gila Valley, Globe & Northern railways have all generously allowed students in attendance upon the University half rates when journeying to and from their homes. This applies only to those parts of these railroads in Arizona. In the case of students coming to the University, these half rates may be secured by notifying the President of the University at least two weeks in advance, to enable him to secure the permits from the proper authorities. Tickets may then be obtained by the student on application to his own local railroad ticket agent or to the nearest agent in Arizona, e. g. Nogales or Yuma. Students at the University may secure transportation to their homes and return at vacation time by making application at the office of the President of the

University. In case of any misunderstanding with the ticket agent, the student should pay full fare, take the agents receipt and report the matter to the University authorities. The University can not undertake to secure rebates from the railroad companies in cases where full fare has been paid, unless it can be clearly shown that the railroad company's agents or officers are at fault.

REQUIREMENTS FOR ADMISSION.

Applications for admission to any department of the University will be required to furnish satisfactory evidence of good moral character, and certificate of graduation or of honorable dismissal from the schools with which they were last connected.

Beginning with September, 1904, for admission to the Freshman class, applicants must be at least sixteen years of age and must satisfy requirements in subjects sufficient to give sixteen credits as described below. A credit is understood to be the equivalent of one study pursued satisfactorily for one year, one period a day, as ordinarily taught in high schools.

Students coming from approved high schools, and presenting a detailed official statement of work completed from the principals of such schools, will be excused by the committee on registration from entrance examinations in those subjects covered by the credentials.

For admission to the course leading to the degree of Bachelor of Philosophy the subjects upon which examinations must be passed, and the credits assigned each, are:

English	4	Latin	3
Mathematics	2	Greek, French, German or Spanish	2
History and Civics	2		
Science	1	Elective	2

For admission to the course leading to the degree of Bachelor of Science, including the degrees of Bachelor of science in Mining, Engineering, Chemistry or Agriculture, the subjects upon which examinations must be passed, and the credits assigned each, are:

English	4	French German or Spanish	2
Mathematics	4	Science (Physics required)	3
General History and Civics	2	Elective	1

The scope of work required in these various subjects is as follows:

ENGLISH—(a) English classics. An acquaintance with the works named below. These works are divided into two classes, those intended for thorough study and those intended for general reading. The portion of the examination devoted to the former class will be upon subject matter, form and structure. In addition, the candidate may be required to answer questions involving the essentials of English grammar, and the leading facts in those periods of English literary history to which the prescribed books belong. In the portion of the examination devoted to the latter class, the candidate will be required to present evidence of a general knowledge of the subject matter, and to answer simple questions on the lives of the authors. The form of examination will usually be the writing of a paragraph or two on each of several topics, to be chosen by the candidate from a considerable number—perhaps ten or fifteen—set before him in the examination paper. The treatment of these topics is designed to test the candidate's power of clear and accurate expression, and will call for only a general knowledge of the substance of the books. In preparation for this part of the requirement, it is important that the candidate shall have been instructed in the principles of writing English. A knowledge of grammar is presupposed. (b) English composition. This requirement can be met only by examination of the candidate or by his presenting satisfactory composition books or themes certified by a former teacher as original uncorrected work. The examination will take the form of a theme of five hundred words on some subject familiar to the candidate and will be a practical test of his ability to express himself in writing clearly and consecutively. No candidate will be accepted whose work is notably defective in point of neatness, spelling, punctuation, idiom, or division into paragraphs. Those found lacking in composition will be required to make good the deficiency at once in a special class organized for that purpose.

No student will be admitted without examination, except on the certificate from his former instructors that the entire requirement has been fulfilled. Substantial equivalents, properly certified, will be accepted.

For thorough study: For 1904, 1905, 1906, Shakespeare's Macbeth; Milton's L'Allegro, Il Penseroso, Comus, Lycidas; Burke's Speech on Conciliation with America; Macaulay's Essays on Milton and Addison.

For general reading: For 1904, 1905, 1906, Shakespeare's Merchant of Venice and Julius Caesar; the Sir Roger de Coverley Papers in "The Spectator;" Goldsmith's Vicar of Wakefield; Coleridge's Rime of the Ancient Mariner; Scott's Ivanhoe; Carlyle's Essay on Burns; Tennyson's The Princess; Lowell's Vision of Sir Launfal; George Eliot's Silas Marner.

MATHEMATICS—Arithmetic as covered in White's Advanced Arithmetic to the appendix, but these subjects will be omitted in the entrance examinations: longitude and time, present worth, stock investments, exchange, equation of payments, compound proportion, partnership and cube root. Algebra, through quadratic equations, as given in Wells's Essentials of Algebra or Wentworth's New School Algebra. Plane geometry as treated in the latest editions of Wentworth or Wells. For students in the scientific and engineering courses, solid geometry and advanced algebra, each requiring a half-year of work, will also be required.

HISTORY AND CIVICS—As much as is included in Adams' "European History" and "Hinsdale's American Government," or text books covering equivalent ground. To meet these requirements a large amount of reference work is expected. In place of General History the following will be accepted: History of Greece and Rome as contained in Myers' histories of Greece and Rome or an equivalent, and Coman and Kendall's or Larned's "History of England."

*GREEK—As covered by Gleason and Atherton's Beginners' Greek Book; Xenophon's Anabasis, four books; Homer's Iliad, three books, with composition and the use of Hadley and Allen's, or Goodwin's Greek Grammar.

*LATIN—As covered by Collar's First Latin Book and Viri Romae, together with Allen and Greenough's Grammar and texts; sight reading; Caesar, four books,

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*If any language is offered it must be to the extent of two credits, since a single year's study of a language is not considered of sufficient educational value to be entitled to credit.

or an equivalent; Cicero, four orations; Virgil, six books; sight reading from Nepos, Cicero and Gellius; Daniell's or Bennett's Prose Composition.

*GERMAN—As covered by Spanhoofd's "Lehrbuch der deutschen Sprache," and the Syntax (part II) of Thomas' German Grammar, with readings outlined for German 1, 2, 3, 4, (see page 52), or an equivalent.

*SPANISH—As covered by Hills and Ford's Spanish Grammar with readings, etc., outlined for Spanish 1, 2, 3, 4, or an equivalent.

*FRENCH—As covered by Fraser and Squair's French Grammar (Parts I and II), with readings, etc, outlined for French 1, 2, 3, 4 (see page 50), or an equivalent.

SCIENCE—Under this head may be offered the required number of credits in the following subjects: physical geography, physiology, botany, chemistry, physics, elementary astronomy. At least half the preparation in science should consist of laboratory work. Note-books, covering such laboratory work as has been performed by the student, should be presented for examination.

ELECTIVE—The remaining credits required may be made up from additional subjects ordinarily taught in high schools.

Students from other institutions of equivalent rank may be admitted to the higher classes upon the presentation of properly authenticated certificates showing to the satisfaction of the faculty that they are qualified to proceed with the desired work. These certificates must

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*If any language is offered it must be to the extent of two credits since a single year's study of a language is not considered of sufficient educational value to be entitled to credit.

be accompanied by statements of honorable dismissal, or leaves of absence.

Arrangements have been made with the Arizona Normal School at Tempe, and the Northern Normal School at Flagstaff, whereby students from these institutions may have their record, transferred to the books of the University with proper credit, upon presentation of a certificate duly signed by the principal. Students of this University may also obtain the equivalent privilege at the Normal Schools by presenting the proper certificate of standing, signed by the President.

The faculty desires to establish such relations with high schools and other educational institutions as will enable it to accept their certificates without question. To this end presiding officers are respectfully requested to correspond with the President.

COURSES OF STUDY AND DEGREES.

All facilities and privileges of the University are open to qualified persons of both sexes.

The University offers four-year courses of study leading to the degrees of Bachelor of Philosophy and Bachelor of Science, and to those degrees specialized as shown on page 40-41. In each course the work is partly required and partly elective, as described by schedules later. Each student doing full work is required to take not less than sixteen hours of class room work per week. In laboratory work a period from two to three hours is considered the equivalent of one recitation hour.

Persons of mature age and with sufficient preparation, who are not candidates for a degree, will in some cases be admitted to regular classes as special students, provided, however, that in all such cases they show to the satisfaction of the instructors in charge that they can take the course with profit to themselves and without detriment to the regular class.

The faculty reserves the right to omit classes in any course of instruction unless a suitable number of students register for the course.

Students who have completed satisfactorily the required work, and the specified amount of elective work, as shown in the accompanying schedules, will be given the degree of Bachelor of Philosophy or Bachelor of Science. The special character of any course of study may be indicated by adding to the degree the name of the department, as: Bachelor of Science in Mining, or Bachelor of Science in Chemistry.

The advanced degrees of Master of Science and Master of Arts will be conferred upon Bachelors, graduates from this University or from institutions of equivalent grade, who have successfully pursued at the University a course of study marked out by the faculty and requiring not less than one year.

Military science and tactics or, for women, physical culture, is required during the Freshman and Sophomore years. If for any reason a student is excused from these exercises, an additional subject having a minimum of three recitation hours per week will be required.

Credit toward degrees is given by means of a unit system which assigns to each course of instruction offered a certain number of units of credit. A unit ordinarily represents one class-room hour per week, or its equivalent, for one semester. One hundred twenty-eight units, besides eight units in military science and tactics and physical culture, are required for obtaining a degree in any course.

Any candidate for a degree may present as part fulfillment of requirements for graduation an acceptable thesis embodying the results of a special study of some subject within the range of the course pursued. The subject of the thesis must be submitted for the approval of the faculty at the opening of the Senior year, and the completed thesis must be presented not later than three weeks before commencement day. The credit value will be determined by the faculty at the time the subject is approved.

The number or units of work offered in different subjects is shown in the following scheme:

	Units.
English	24
Oratory	6
Mathematics	25

GROUP A.

Latin	16
Greek	16
French	16
German	22
Spanish	22

GROUP B.

History	88
Economics	10
Philosophy	19
Sociology	8

GROUP C.	Units.
Botany	16
Zo-ology	8
Chemistry	44
Met. Chem. and Assayng.	9
Geology	16
Mineralogy	12
Physics	8
Photography	2

GROUP D.

Mechanic Arts	20
Civil Engineering	39
Mechanical Engineering	22

The units necessary for the different degrees are as follows:

1. BACHELOR OF PHILOSOPHY.
   a Required—English, 24 units, Philosophy, 15 units, History and Economics, 8 units.
   b Group Elective—From Group A, 32 units; Group C, 16 units.
   c Free electives—33 units.

2. BACHELOR OF SCIENCE.
   a Required—English, 8 units, Mathematics, 16 units.
   b Group Electives—From Group B, 4 units; Groups C and D, 56 units.
   c Free Electives, 44 units.

3. For the degrees of Bachelor of Science in Mining, Chemistry, Civil Engineering, and Mechanical Engineering, the same work is required in all for the

first two years, with differentiation during the third and fourth years.

MINING, CHEMISTRY, CIVIL ENGINEERING, MECHANICAL ENGINEERING.

First year		Second year.	
English, 1, 2	6 units.	Mathematics, 3, 4,	6 units.
Mathematics, 1, 2,	10 "	Physics 1, 2,	8 "
Chemistry, 1, 2,	8 "	Chemistry, 3, 4,	8 "
Mech. Arts, 1, 2	8 "	Mech. Arts, 3, 4,	4 "
	32	Civil Engin. 1, 2,	8 "
			34

MINING.

Third year.		Fourth year.	
Mathematics, 5, 6,	9 units	Metallurgy, 1, 3, 4,	8 units.
Mineralogy, 1, 2,	7 "	Met. (Laboratory)	4 "
Geology, 1, 2,	8 "	Hydraulics,	4 "
Civil Engin., 5, 6,	8 "	Mine Engin.	4 "
	32	Mineralogy, 3, 4,	4 "
		Heat Engines	3 "
		Mech. Engin.,	3 "
			30

CHEMISTRY.

Third year.		Fourth year.	
Chemistry, 5, 7,	8 units.	Chemistry, 9, 10	8 units.
" 7, 8,	8 "	Synthetic Chem.	4 "
Mineralogy, 1, 2,	8 "	Physical "	2 "
Geology, 1, 2,	8 "	Mineralogy, 3, 4,	4 "
	32	Economics, 1, 2,	4 "
		Elective	8 "
			30

CIVIL ENGINEERING.

Third year.			*Fourth year.		
Mathematics, 5, 6,	9	units.	Civil Eng. 7, 8,	8	units.
Civil Eng. 5, 6,	8	"	" " 10, 11,	8	"
" " 4,	1	"	Heat Engines,	3	"
" " 9,	4	"	Mech. Engin.,	3	"
" " 12,	2	"	Elective	8	"
Geology, 1, 2,	8	"		31	
	32				

MECANICAL ENGINEERING.

Third year.			*Fourth year.		
Mathematics, 5, 6,	9	units.	Mec. Eng. Lab.	8	units.
Civil Engin., 5, 6	8	"	Machine Design,	4	"
Mech. Arts, 5, 6,	4	"	Mechanical Eng.	4	"
Heat Engines	3	"	Hydraulics,	4	"
Mech. Engin.,	3	"	Mine Engin.	4	
Pattern making and Foundry Practice,	4	"	Elective,	7	"
	31			31	

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*The fourth year's work in the Civil and Mechanical Engineering courses will not be effective until 1906-7.

EXPLANATION OF COURSE OF INSTRUCTION

Courses having odd numbers are given in the first semester. Those having even numbers, in the second semester. The hours mentioned show the number of periods per week. The subjects are arranged alphabetically.

BIOLOGY.

PROFESSOR THORNBER.

The courses which follow are calculated to articulate with the work done in biology in average western high high schools.

The Desert Botanical Laboratory of the Carnegie Institution of Washington, D. C., has been located in the Tucson mountains adjoining Tucson, with Dr. W. A. Cannon, recently of the New York Botanical Garden, as resident director. In this laboratory, the southwest with its unique and as yet little investigated flora, gains what is destined to be one of the important centers of active, scientific research. The research facilities of the laboratory are all that could be desired, and the investigations upon the desert flora will appeal to students of botany from all quarters. In the light of the above, the importance of the Desert Botanical Laboratory to the University of Arizona and especially to the department of botany will be apparent.

BOTANY 1,2. GENERAL BOTANY—Botany 1 treats of the general principles of the histology and physiology of plants. Botany 2 completes the year's work with a general survey of plant types from Protophyta to Spermatophyta; also the elementary principles of field botany. Guide, Bessey's Essentials of Botany, supplemented with other tests and lectures. The laboratory studies will form the basis of all of the work. Open to all students. 5 hrs., or an equivalent, both semesters. 8 units.

BOTANY 3, 4. ADVANCED BOTANY—The second year's work is not definitely outlined, but it is purposely left open to be formulated as the needs of the students applying appear to demand. Courses in general morphology of the fungi, morphology of the fungi with special reference to forms injurious to vegetation in the Southwest, also histology, physiology, and the taxonomy and ecology of the native flora and allied subjects are offered here. Opportunities are offered for research work. Open to all students who have taken Botany 1, 2. 5 hrs., or an equivalent, both semesters. 8 units.

ZO-OLOGY 1, 2.—Conducted along lines corresponding very closely to those followed in Botany 1, 2. Laboratory studies as in that course are made the main feature of the work which is based upon living, native material where such is available; but some groups are necessarily studied by the aid of preserved specimens. In the study of the Mammalia constant reference is made to human anatomy, so that this portion is made in part a review of the course in anatomy and physiology offered in the sub-collegiate department. Text-book, Parker and Hazwell's "Manual of Zo-ology". Open to all students. 5 hours, or an equivalent, both semesters. 8 units.

CHEMISTRY.

PROFESSOR GUILD, PROFESSOR DE LASHMUTT.

The instruction in chemistry has two main objects in view: first, to promote general culture; and secondly, to introduce students to technical work, especially in mining. The first two years' work in general chemistry, qualitative and quantitative analysis, places the student in a position to take up advantageously the study of mining, agricultural chemistry or metallurgy.

CHEMISTRY 1. GENERAL CHEMISTRY—Lectures illustrating the chemical properties of the elements and their compounds, supplemented by recitations and laboratory practice. Text-books, Newths' Inorganic Chemistry. Open to all students. 4 hrs., first semester, 4 units.

CHEMISTRY 2. QUALITATIVE ANALYSIS—Practical work in the laboratory, including the analysis of alloys, commercial products, minerals, and like substances. The course is accompanied by lectures and recitations. Text-book, Eliot and Storer's Qualitative Analysis, and various reference books. Open to students who have taken chemistry 1. 4 hrs., or an equivalent, second semester, 4 units.

CHEMISTRY 3. QUANTITATIVE ANALYSIS—Laboratory practice with lectures and recitations; the work will be chiefly in gravimetric methods of analysis. Open to students who have taken Chemistry 2. 5 hrs., or an equivalent, first semester. 2 or 4 units.

CHEMISTRY 4. VOLUMETRIC ANALYSIS—A continuation of the work in Chemistry 3, special attention being given to the methods of assaying employed in the West. 5 hrs., or an equivalent, second semester, 2 units, if discontinued March 15th, otherwise 4 units.

CHEMISTRY 5, 6. SPECIAL QUANTITATIVE ANALYSIS—The analysis of water, gases, oils, minerals. Open to students who have taken Chemistry 4. 5 hrs., or an equivalent, both semesters. 8 units.

CHEMISTRY 7, 8. ORGANIC CHEMISTRY—Lectures on the carbon compounds; laboratory work in organic analysis and the preparation of organic compounds; vapor density and molecular weight determination. Open to students who have taken Chemistry 3, 4. 4 hrs., or an equivalent, both semesters. 8 units,

CHEMISTRY 9. SYNTHETIC CHEMISTRY—The preparation of pure chemical compounds from the crude mineral products. Open to students who have taken Chemistry 4. 2 hrs., or an equivalent, first semester. 2 units.

CHEMISTRY 10. PHYSICAL CHEMISTRY — Lectures: Historical introduction leading up to a discussion of modern chemical theories. Open to students who have taken Chemistry 3. 2 hrs., second semester. 2 units.

CHEMISTRY 11, 12. CHEMISTRY OF THE RARE ELEMENTS.—The analysis and synthesis of uranium, molybdenum, tungsten, vanadium and cerium compounds. Open to students who have taken Chemistry 6 and 9. 4 hrs., or an equivalent, both semesters. 8 units.

CIVIL ENGINEERING.

PROFESSOR SMITH, MR. ——

This course in this department has been arranged with special reference to the engineering development of the Southwest. Especial stress will be laid on surveying, railroad and bridge work, and irrigation engineering. The design throughout the courses is to give the student a thorough and practical knowledge of the essential principles of his profession, and to teach the technical practice of the times so far as possible without sacrificing in other directions. Engineering practice changes from year to year and a graduate who is thoroughly grounded in the principles of his profession will readily acquire the technical side.

CIVIL ENGINEERING 1, 2. SURVEYING.—Use and care of instruments, including plane and solar compasses, levels, transits; plane land surveying; United States system of land surveys; city, topographical, and mine surveying; earthwork computations; determination of azimuth, latitude, longitude and time by observations on the circumpolar stars and on the sun. One full half-day each week is devoted to field practice, plots are made of field surveys and a topographic map of some area in the vicinity of Tucson is executed by each student. Lectures, recitations, drawing and fieldwork. Textbook, Raymond's "Surveying." Open to students who have taken trigonometry. 3 hrs., both semesters and Saturday forenoons. 8 units.

*CIVIL ENGINEERING 4. GEODESY—Size and shape of the earth; latitude, longitude and azimuth formulas; baseline apparatus; trigonometric leveling. Lectures and fieldwork. 1 hr., second semesters. 1 unit.

CIVIL ENGINEERING 5. MATERIALS OF CONSTRUCTION—Their properties, preparation and use; stone, brick, lime, cement, concrete, timber, iron and steel. Lectures, recitations and laboratory work. 4 hrs., first semester. 4 units.

CIVIL ENGINEERING 6. GRAPHIC STATICS—Determination of stresses in bridge and roof trusses by both analytic and graphic methods. Prerequisite, Physics 1. 4 hrs., second semester. 4 units.

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*Not given in 1905-6.

*CIVIL ENGINEERING 7, 8. MODERN FRAMED STRUCTURES—Stresses in the various types of bridges under different systems of loading; graphical investigation of stability of arches and retaining walls; complete design with drawings for a plate girder bridge, and a steel frame building. Text-book, Merriman & Jacoby's "Roofs and Bridges." 4 hrs., both semesters. 8 units.

CIVIL ENGINEERING 9. RAILROAD ENGINEERING—Preliminary and location surveys; simple and easement curves; turnouts and switches; principles of economic location as based upon cost of construction, operating expenses, alignment and grades; maintenance-of-way. The fieldwork consists of the surveys for a railroad of sufficient length to secure familiarity with the methods of actual practice. Each student makes a complete set of notes, maps, profiles, calculations and estimates of cost. Open to students who have taken Engineering 1, 2. 4 hrs., until December, one hour and Saturdays through December and January. 4 units.

CIVIL ENGINEERING 11. HYDRAULICS—Velocity and discharge from orifices, weirs. tubes, and pipes; flow in sewers, ditches, canals, and rivers; measurement of water power; water wheels of various types. Text-book, Merriman's "Hydraulics," 4 hrs., first semester. 4 units.

CIVIL ENGINEERING 10. MINE ENGINEERING—Prospecting; exploratory workings; boring with percussion and diamond drills; hand and machine rock drills; explosives: blasting; laying out of workings; timbering; methods of winning the ore; hoisting and hoisting engines; underground transportation; mine

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*Not given in 1905-6.

ventilation. Text-book, Ihlseng's "Manual of Mining" supplemented by lectures. A portion of the time is devoted to drawing engineering structures such as shaft timbering and steel headframes. Open to students who have taken, or are taking, Mathematics 5, 6. 4 hrs., first semester. 4 units,

*CIVIL ENGINEERING 12. PRINCIPLES OF IRRIGATION—A study of the present condition of irrigation development in the United States; irrigation legislation; methods of establishing rights to water; a brief reference to the engineering principles relating to the construction and maintenance of canals and reservoirs add the various means of diverting and measuring water for use in irrigation. Prerequisite, Engineering 2. 2 hrs., second semester. 2 units.

ECONOMICS.

MR. RUTHRAUFF.

ECONOMICS 1, 2. A study of the general principles and laws of economics based upon Bullock's "Introduction to the Study of Economics." Special attention is given to the study and criticism of socialism, and the problem of municipal and government ownership of natural monopolies and public utilities. 2 hrs. both semesters. 4 units.

ECONOMICS 3, 4. A general study of the history and theory of Economics based upon Marshall's "Principles of Economics," with lectures and required reading. This course aims to acquaint the students with the different modern theories, and economic plans for reform. 3 hrs. both semesters. 6 units.

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*Not to be given 1905-6.

ENGLISH.

ASSISTANT PROFESSOR NEWSOM

The purpose of the courses outlined below is to give a general knowledge of English literature from the sixteenth century to the present time. Chief stress is placed upon the study of a few authors of the most important periods, though the history of our literature is also traced from age to age. The course in composition aims to develop accurate thought and clear, vigorous expression.

ENGLISH 1 and 2. COMPOSITION—Prescribed for all Freshmen.

FIRST SEMESTER: Short weekly themes corrected and rewritten. Selected readings from English and American writers of prose, with written and oral reports.

SECOND SEMESTER: Fortnightly themes illustrating methods in narration, description, exposition, and argumentation. Hill's "Principles of Rhetoric" supplemented by lectures. Selected readings and reports thereon as in the first semester. 3 hrs., both semesters. 6 units.

ENGLISH 3 and 4. NINETEENTH CENTURY PROSE—From the publication of the Lyrical Ballads to the death of Ruskin (1798–1899). Prescribed readings, lectures, discussions, written reports. Primarily for Freshmen in the Ph. B. courses. 2 hrs., both semesters. 4 units.

ENGLISH 5 and 6. ELIZABETHAN LITERATURE—Shakespeare, selected plays; other Elizabethan dramatists, especially Jonson and Marlowe; Spenser's Faerie Queene and shorter poems. Lectures and discussions. 3 hrs., both semesters. 6 units.

English 7, 8. Eighteenth Century Literature—From the death of Dryden to the publication of the Lyrical Ballads, 1700–1798; special attention given to the Queen Anne period and the early romantic revival. Lectures and discussions. 2 hrs., both semesters. 4 units.

English 9, 10. Seventeenth Century Literature—From the closing of the theaters to the death of Dryden, 1642–1700. 2 hrs., both semesters, 4 units.

English 11, 12. Nineteenth Century Poetry—From the publication of the Lyrical Ballads to the death of Tennyson, 1798-1892. Lectures and discussions; Macmillan's Globe editions. 2 hrs., both semesters. 4 units.

FRENCH.

ASSISTANT PROFESSOR TURRELL

French 1, 2. First Semester: Fraser and Squair's French rammar (Part I), Aldrich and Foster's French Reader. Second Semester: Reading of Dumas' "La Belle Nivernaise," Labiche and Martin's "La Poudre aux Yeux," Halévy's "L' Abbé Constantin." Composition and dictation, with drill on the irregular verbs. 5 hrs., both semesters. 8 units.

French 3, 4. First Semester: Fraser and Squair's French Grammar (Part II). Merimée's "Colomba,' Lamartine's "Graziella" or "Jeanne d' Arc," Feuillet's "Le Roman d'un jeune homme pauvre." Second Semester: Selected Readings, as DeVigny's "Cinq Mars," French Lyrics (Bowen), Victor Hugo's "Les Misérables" (Super), etc. 5 hrs., both semesters. 8 units.

GEOLOGY

PROFESSOR W. P. BLAKE, PROFESSOR TOLMAN.*

The objects of the course of instruction in geology are chiefly general culture and practical advantages gained in agriculture and mining. The student is instructed regarding the changes that have taken place upon the globe; in the formation of rocks, soils and mineral deposits, and in the progress of life and the environment of humanity.

GEOLOGY 1. GENERAL GEOLOGY — An astronomical introduction followed by a discussion of the formation and composition of the crust of the earth, rock-forming minerals, crystalline and mechanically and chemically formed rocks; erosive agencies, transportation and deposition of rock-forming materials; the origin of soils and their distribution; volcanic formations, metamorphism; stratification; uplifts and depression; folding and complication; origin of mountain chains; the sequence of formations, the geologic record. 5 hrs., first semester. 4 units.

GEOLOGY 2. ECONOMIC GEOLOGY—In the second semester a course of lectures is given upon the nature and origin of mechanically-formed deposits; upon the various theories of origin and the systems of classification, followed by a description in detail of the form of occurrence of useful minerals and ores. The lectures are supplemented by readings and reports.

The lectures are illustrated by ores and specimens from the museum, especially of the Comstock and other lodes in Nevada; of the copper mines in Arizona, including the United Verde, Copper Queen and others; the gold mines of the Appalachians, California, Alaska and Arizona, including the mines of Tombstone, Congress, Pearce, and Fortuna, the Cananea copper mines and other mines in Mexico. Text-book, Kemp's Ore Deposits of the United States. Open to Juniors, Seniors, and special students who have taken chemistry, mineralogy and geology 1. 5 hrs., second semesters. 4 units.

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*After September 1, 1905.

GEOLOGY 3, 4. TOPOGRAPHICAL AND FIELD GEOLOGY—Field and laboratory work, construction of maps, sections and models, etc. Prerequisites Geology 1, 2. 3 hrs., both semesters. 6 units.

GERMAN.

ASSISTANT PROFESSOR TURRELL.

GERMAN 1, 2. First Semester: Spanhoofd's "Lehrbuch der deutschen Sprache," complete. Second Semester: Reading of easy texts, such as Andersen's "Bilderbuch ohne Bilder," Storm's "Immensee," von Hillern's "Hoeher als die Kirche," Gerstaecker's "Germelhausen." Composition, dictation and continued grammar drill. 5 hrs., both semesters. 8 units.

GERMAN 3, 4. First Semester: Thomas' German Grammar (Part II) Reading of Freytag's "Die Journalisten," Heine's poems and "Die Reisebilder," Lessing's "Minna von Barnhelm." Second semester: Goethe's "Hermann und Dorothea," "Egmont," Schiller's "Wilhelm Tell," "Maria Stuart." An outline of the history of German Literature will be given during the year using Bernhardt's "Deutsche Litteraturgeschichte," with library readings. 5 hrs., both semesters. 8 units.

GERMAN 5. German Literature in the Nineteenth Century. Lectures on the Romanticists and their successors. Class reading of plays of Kleist, Grillparzer, etc. 3 hrs., first semester. 3 units.

GERMAN 6. Recent literary movements in Germany. The rise of naturalism and symbolism. Comparison with the Storm and Stress movement of the eighteenth century. Study of Wildenbruch, Fulda, Sudermann, Hauptmann. 3 hrs., second semester. 3 units.

HISTORY

PRESIDENT BABCOCK, MR. RUTHRAUFF.

In the work in history emphasis is placed on the social and political development, the relation of cause and effect and the unity of history. The laboratory method is used wherever possible and individual work insisted upon.

HISTORY 1, 2. ENGLISH HISTORY—Gardiner's Student's History of England is used as the basis for the work, with much assigned reading and the preparation of reports. Open to all students. 4 hrs., both semesters. 8 units. Mr. Ruthrauff.

*HISTORY 3, 4. AMERICAN COLONIAL HISTORY—A detailed study of the American colonies under Great Britain, and of the United States to the adoption of the Constitution. Lectures, assigned reading, and reports. Open to students who have taken History 1, 2. 2 hrs., both semesters. 4 units.

HISTORY 5, 6. CONSTITUTIONAL HISTORY OF THE UNITED STATES—A detailed study of the formation of the Union and of the political and constitutional history of the United States, down to 1885 based on letters and speeches of American statesmen, public documents and

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*Not given in 1904-5.

special histories. Open to students who have taken History 1, 2. 3 hrs., both semesters. 4 units. President Babcock.

LATIN.

MRS. STANLEY.

The courses below are open to students who have completed the first two years of Latin in the sub-collegiate department, or an equivalent. Constant, thorough drills are given in technical grammar and prose composition. In reading, the matter is subjected to grammatical, metrical, rhetorical and historical explanation. The study of the text is made the means of mental discipline, of developing the faculties of observation and critical judgment, and of acquiring habits of thoroughness and accuracy.

LATIN, 1, 2 CICERO AND OVID—Six Orations of Cicero. Selected Letters. Gleason's Term of Ovid. Exercises in Prose composition. 4 hrs., both semesters. 8 units.

LATIN 3, 4. [3] VIRGIL.—Six Books [4] Livy Book I, Cicero's De Senectute. Open to students who have taken Latin 1, 2. 4 hrs., both semesters. 8 units.

MATHEMATICS.

PROFESSOR E. M. BLAKE.

MATHEMATICS, 1. COLLEGE ALGEBRA — Four hours per week. GRAPHICAL METHODS. One two hour laboratory period per week. First semester 5 units.

MATHEMATICS 2. PLANE AND SPHERICAL TRIGONOMETRY — Four hours per week. GRAPHICAL METHODS, One two hour period per week. Second semester. 5 units.

Mathematics 1 and 2 are prescribed for first year students in Mining, Civil, and Mechanical Engineering, and Chemistry. The work in graphical methods is supplementary to algebra and trigonometry and introductory to analytical geometry.

MATHEMATICS 3. ANALYTICAL GEOMETRY.—Prerequisite Mathematics 1, 2. 3 hrs., first semester. 3 units.

MATHEMATICS 4. DIFFERENTIAL CALCULUS—Prerequisite, Mathematics 3. 3 hrs., second semester. 3 units.

Mathematics 3 and 4 are prescribed for second year students in Mining, Civil and Mechanical Engineering and Chemistry.

MATHEMATICS 5. INTEGRAL CALCULUS — Prerequisite, Mathematics 4. 4 hrs., first semester. 4 units.

MATHEMATICS 6. ANALYTICAL MECHANICS—Prerequisites, Mathematics 5, and Physics 1, 2. 5 hrs., including one laboratory period, second semester. 5 units.

Mathematics 5, 6 are prescribed for third year students in Mining, Civil and Mechanical Engineering.

MECHANIC ARTS.

PROFESSOR HOLMES.

The mechanic arts courses comprise the elements of drawing and shop work. The work consists of lectures, recitations, drawing and tool and machine work. The courses are designed with special regard for the needs of the students in engineering.

MECHANIC ARTS 1. (a) Free hand lettering, one month; Reinhardt's slanting and upright styles; titles and tabulated data. (b) Mechanical drafting, one month; care and use of instruments; Reinhardt's "Technic of Mechanical Drafting;" geometrical construction; tracing; blue printing. (c) Descriptive geometry, Church's seventeen problems on lines and planes, two months. Required of students in Engineering. 5 hrs., or an equivalent, first semester. 4 units.

MECHANIC ARTS 2. (a) Forging, one month; properties of iron and steel, methods of manufacture; care of fire; use or forging tools; tool-making and tempering. (b) Bench work in wood, two months; characteristics and properties of wood; care and use of wood-working tools; principles of joinery. (c) Wood turning, one month; care and use of wood lathe and tools; application of wood turning in pattern making. 5 hrs., or an equivalent, second semester. 4 units.

MECHANIC ARTS 3, 4. (a) Bench work in iron, one month; wrought and cast iron; use of hammer, file chisel, and scraper. (b) Machine work in iron, two months; use of engine lathe in turning, boring and thread cutting; drilling machine. (c) Planing and milling machines, one month; special study of comparative efficiency of each in producing similar work. Required of engineering students. Open to students who have taken Mechanic Arts 1, 2. 2 hrs., or an equivalent, both semesters. 4 units.

MECHANIC ARTS 5, 6. Descriptive Geometry; this course is a continuation of Mechanic Arts 1. Church's Descriptive Geometry is the text-book used. The work covers shade, shadow and perspective. Required of engineering students. Open to all students who have taken Mechanic Arts 1, 2. 2 hrs., or an equivalent, both semesters. 4 units.

MECHANIC ARTS 7, 8. Pattern Making and Foundry Practice. Required of Juniors in Mechanical Engineering. 2 hrs., (two 2-hour periods), both semesters. 4 units.

MECANICAL ENGINEERING

PROF. E. M. BLAKE.

MECHANICAL ENGINEERING, 1. HEAT ENGINES—Principles of thermodynamics as applied to steam and internal combustion engines, and compressed air machinery. Study of the general structural features and methods of operating the more important types of boilers, steam and gasoline engines. 3 hrs., with one weekly laboratory period, first semester. 3 units.

MECHANICAL ENGINEERING. 2. DYNAMO ELECTRIC MACHINERY—Theory underlying the generation, transmission, and utilization of electric currents. Descriptions of the more important types of generators and motors. 3 hrs., with one weekly laboratory periods, second semester. 3 units.

MECHANICAL ENGINEERING, 3, 4. MECHANICAL LABORATORY—Operation inspection and testing of boilers, steam and gasoline engines, compressed air machinery, pumps, water wheels and electric machinery. One lecture and two laboratory periods of three hours each per week throughout the year. 8 units.

*MECHANICAL ENGINEERING, 5. MACHINE DESIGN—Kinematics of machinery, study of machine details, and exercises in design. One lecture and two drafting room periods of three hours each per week, first semester. 4 units.

*MECHANICAL ENGINEERING, 6. MECHANICAL ENGINEERING—Study of power plants and other

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*Not to be given 1905-1906.

machinery installations as to arrangement of parts, adaptability to intended work, economy of first cost and operation. Exercises in design of power plants and writing of specifications. One lecture and two drafting room periods of three hours each per week, second semester. 4 units.

METALLURGY.

PROFESSOR DELASHMUTT.

METALLURGY 1. INTRODUCTION TO METALLURGY—Physical properties of metals, alloys, thermal treatment of metals, thermal measurements, fuel, refractory materials, metallurgical processes, furnaces, thermochemistry, metallurgy of iron and steel. Seniors in School of Mines. Lectures and recitations. 4 hrs., for 1 month, first semester. 1 unit.

METALLURGY 2. FIRE ASSAYING—Fire assay for gold, silver and lead. Bullion assays. 15 hrs., or an equivalent during March, April and May. Prerequisite Chemistry 3 and 4. 2 units.

METALLURGY 3. METALLURGY OF GOLD AND SILVER—Stamp milling, chlorination, cyanidation, pan-amalgamation; Patio, Cazo, Fondon, Kröhnke and Tina processes, hyposulphite leaching practice, etc. Lectures and recitations. Prerequisites, Metallurgy 1 and 2. 4 hrs., first semester. To be given after completion of metallurgy 1. 3 units.

METALLURGY 4. METALLURGY OF LEAD AND COPPER—Sampling, receiving, purchasing, roasting, blast furnace methods, reverbatory furnace methods, pyritic smelting, converting, desilverization of base bullion, electrolytic refining, hydro-metallurgy of copper, etc. Lectures and recitations. Prerequisites Metallurgy 1, 2 and 3. 4 hrs., first semester. 4 units.

METALLURGY 5 and 6. METALLURGICAL LABORATORY—Concentration, amalgamation, cyanidation, chlorination, hyposulphite lixiviation, etc., tests together with mill work. 2 hrs., or an equivalent, both semsters. Primarily for seniors in School of Mines. 4 units.

METALLURGY 7. ORE DRESSING—Breaking, crushing, separating, concentrating, sampling, mill processes and management. Lectures and recitations, prerequisites chemistry 3 and 4 and metallurgy 2, 3 hrs., first semester. 3 units.

METALLURGY 8. Metallurgy of zinc, cadmium, nickel, mercury, bismuth, tin, antimony, cobalt, platinum, tungsten, molybdenum. Lectures and recitations. Prerequisites. Metallurgy 1, 2, and 3. 2 hrs., second semester. 2 units.

MILITARY SCIENCE AND TACTICS.

LIEUTENANT MC CLURE.

PRACTICAL COURSE—Infantry Drill Regulations, through the school of the batallion in close and extended order. Advance and rear guards, and outposts. Marches. The ceremonies of batallion review, inspection, parades, guard mounting, and escort of the colors. Infantry target practice. Instruction in First Aid to the Injured. Required of all able-bodied male students throughout the Freshman and Sophomore years except that students who have satisfactorily completed four years of drill at the end of Freshman year may be excused from further work in the department. Elective during the remainder of the course. Juniors who elect this course may receive credit to the extent of two units. Three hours, both semesters.

THEORETICAL COURSE—The Infantry Drill Regulations covered by the practical instruction. The

Manual of Guard duty. Small-Arms Firing Regulations, Parts I, II and VII. The Articles of War. One lecture on camps and camp hygiene. Lectures on other military subjects. Required of all commissioned and non-commissioned officers. One hour, both semesters.

Students claiming exemption from drill will be required to secure a certificate of disability from a physician designated by the faculty, unless the disability is apparent. Those so excused will be required to elect a subject in place of this course. The officers will be appointed from an eligible list determined by examination, both scholarship and class standing being taken into account, according to the principles governing such selection at the United States Military Academy.

Each member of the military organization will be required to provide himself with the required uniform upon his entrance. A deposit covering the cost of the uniform should be made upon registration. The uniform consists of cap, coat and trousers of cadet gray cloth trimmed with black braid, and closely resembles the undress uniform of the United States Military Academy at West Point.

MINERALOGY.

PROFESSOR GUILD.

The main object of the course of mineralogy is to familiarize the students with facts and methods that will enable him to determine the character of an ore or mineral by an observation of its physical properties and by the performance of a few simple tests with the blowpipe. The value of such a course cannot be over estimated, since these quick methods of analysis are frequently needed in the field and mine when recourse cannot be had to a well-equipped chemical laboratory. The course is of value also to the student of general science, since it adds to the pleasure of a day in the mountains or field, and is necessary to a full appreciation of the study of geology. The course is not only practical, but the theoretical side of the subject receives attention in mineral optics, crystallography and similar topics.

MINERALOGY 1, 2—Lectures and recitations in crystallography and the classification and uses of minerals; laboratory work in blow-pipe analysis and determinative mineralogy; work with the reflecting goniometer in measuring the angles of crystals, and with the polariscope in studying the optical properties of minerals; the study of a type collection of 600 minerals arranged and classified according to Dana. Text-books: Dana's Text-Book of Mineralogy, and Brush's Manual of Determinative Mineralogy and Blow-Pipe Analysis. Open to students who have taken Chemistry 2. 4 or 5 hrs., both semesters. 7 or 8 units.

MINERALOGY 3. Advanced crystallography and microscopic study ot the rock-forming minerals. Open to students who have taken a course in elementary Geology, Mineralogy 2, and Physics 2. 3 hrs., or an equivalent, first semester. 2 units.

MINERALOGY 4. PETROLOGY—The preparation of thin sections of rocks for microscopic study, rock analysis, and the study of a type selection of rocks. Text-book, Harper's Petrology for Students. Open to students who have taken Mineralogy 3. 3 hrs., or an equivalent, second semester. 2 units.

MINING ENGINEERING.

MINING ENGINEERING I. See Civil Engineering 10.

MINING ENGINEERING 2. PRACTICAL MINING—Before entering upon the work of the Senior year, all students who are candidates for the degree of B. S. in mining, must have spent at least four weeks in practical underground mining. The fulfillment of this requirement must be evidenced by the certificate of the mine superintendent or foreman, and by notes and sketches of the processes observed, to be presented to the faculty of the School of Mines, and discussed with them.

MINING EXCURSIONS.

In connection with the courses in Mine Engineering, Metallurgy, and Mineralogy, trips will be made to mining districts of Arizona and Sonora, usually one in December and one in March. These trips are required of all candidates for the degree of B. S. in Mining.

The purpose of these trips is to afford the mining students an opportunity for close study and inspection of mining and metallurgical plants, and of rock formations and minerals of commercial value. The students are accompanied by two professors, and every effort is made to make the trips of the greatest practical value. The visits are carefully scheduled and notes, with sketches, measurements and photographs are taken, and elaborated into a comprehensive report by each student after the return. These trips are of incalculable assistance to the lecture, text-book and draughting room work.

The subjects of special consideration are transportation, both above and below the surface, mine surveying, methods of stoping and timbering, the best treatment for each ore, assaying and furnace charges, smelting practices, concentration of low grade ores, power generation, pumping and water supply, and mill construction.

During 1903-4 the mining districts of Tombstone, Bisbee, and Cananea, and the metallurgical plants at Douglas were visited in this way. The thanks of the University are due to the superintendents of the various plants visited for their efforts and care in acquainting the students with the works under their management.

PHILOSOPHY AND SCIENCE.

MRS. STANLEY.

*PHILOSOPHY 1. HISTORY OF PHILOSOPHY—A study of the basal concepts and fundamental problems of philosophical thought as developed historically. Lectures, recitation and assigned reading. Text-book Schwegler's History of Philosophy. 2 hrs., both semesters. 4 units.

*PHILOSOPHY 2. EVOLUTION—A study of the term in its widest extension, as the law of the cosmic process. Its significence in the various departments of science and its bearing on philosophical and ethical thought. Reading in Fiske's Cosmic Philosophy; Le Conte's Evolution and its Relation to Religious Thought; Wallace's Darwinianism; Spencer, Principles of Sociology; Bagehot's Physics and Politics, and Howison's Limits of Evolution. Lectures and discussions. 2 hrs., both semesters. 4 units.

PHILOSOPHY 3. PSYCHOLOGY—A special consideration of the subject as applied to teaching. Lectures, recitations and collateral reading. Open to Juniors and Seniors. 4 hrs., first semester. 4 units.

PHILOSOPHY 4. PEDAGOGY—An account of educational evolution, both as a culture fact in the history

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*To be omitted 1905-6.

of civilization and as a foundation for professional work; lectures, giving a brief but comprehensive outline of school systems, a special study of leading educators such as Commenius, Pestalozzi, Froebel, Mann and others; methods of teaching, school management, and school law. Arrangements have been made with the Tucson city schools to use the Holliday school as a practice school for this class, Open to students who have taken Philosophy 1. 4 hrs., second semester. 4 units.

PHILOSOPHY 5. LOGIC — Text-book, "Jevon's Logic;" reading from Mill, Hamilton, Thompson and others. Open to Juniors and Seniors. 4 hrs., first semester. 4 units.

PHILOSOPHY 6. ETHICS—Theoretical and practical ethics; view of the historical development of the science; origin and development of the moral consciousness; application of the principles of ethics to the problems of life. Lectures, discussions and assigned reading. Open to Juniors and Seniors. 3 hrs., second semester. 3 units.

PHYSICAL CULTURE

DIRECTOR KATES.

This department is organized to supply the opportunity for such physical work as experience has shown to be necessary under modern conditions, to counteract the deleterious effects of close application to mental work and to favor the attainment by the student body of a high state of physical efficiency.

Class work in Physical Culture is required of all freshmen, two periods per week.

It is intended that a thorough physical examination; including an examination of the eyes, heart and lungs, shall preface the work of every student in physical culture. This examination will be made as soon as possible after the student enters the University and at intervals during his or her course for safety and for determining the results of the work. Anthropometric cards and charts are platted for students when desired. In special cases the University reserves the right to require a complete physical examination by a designated physician at the expense of the student.

In addition to the regular class drill a certain part of which consists of training and contests in athletic sports, the University is represented by teams in football, baseball, track and field, tennis, basket-ball, and indoor gymnasium work. Every facility is provided for track and field athletics. The field on the campus contains gridiron, baseball diamond, tennis and basket-ball courts, sprinting path, jumping and vaulting pits.

The course for women consists of systematic exercises for the harmonious development of the entire body, besides a course for the development of grace of movement and the production of symmetry of physique. Special corrective machinery is supplied for this department, so that even the weakest student may be given proper and healthful exercise.

Those pursuing this course are required to provide themselves with a gymnasium suit, consisting of a blouse waist and divided skirt with the regulation gymnasium shoes. The suit requires four yards of double width, 54-in. dark blue serge. The waist has a sailor collar trimmed with white braid. The Butterick pattern may be used or ready-made suits may be had at the Gymnasium for $3.75.

The plan of work for men is three-fold: general graded class work, corrective work and elective athletic work. The athletic work is taken in combination with the class work in order that the student by this combination may obtain the best possible development. The corrective work is given under special supervision to all those who are in need of special development, and, also, to those who are unable to do the regular class work.

The students doing work in the Gymnasium are required to wear the regulation gymnasium shoes and suit. The average cost of this suit is about $3.75.

PHYSICS.

PROFESSOR SMITH, MR. WILCOX.

The object of this course is to acquaint the student with the physical principles which underlie the higher courses of chemistry, mechanics, and engineering. Special attention is therefore given to the study of force and energy, the physics of liquids and gases and heat. One third of the course is devoted to the study of electricity, for which the laboratory is especially well equipped.

PHYSICS 1, 2. Lectures, recitations and laboratory work. Open to students who have taken a course in elementary physics and Mathematics 1. 4 hrs., or an equivalent, both semesters. 8 units.

PUBLIC SPEAKING.

MR. GORBY.

The object of these courses is to give instruction and training in the principles of expression. Special attention is paid to developing the voice, to strengthening all the powers of the voice and body and to bringing these powers into perfect harmony, that the student may adequately express his ideas. The training is to afford means for general culture, to induce more careful study of and a deeper insight into the meaning and purpose of the great masters of literature.

*PUBLIC SPEAKING 1, 2. Study of the philosophy of expression, analysis of voice, quality, force, stress, pitch, besides thorough training in the art and practice of extempore speaking. Text-book, Fulton and Trueblood's Practical Elocution. 2 hrs., both semesters. 3 units.

*PUBLIC SPEAKING 3, 4. ADVANCED COURSE—Analysis and interpretation of higher forms of literature. Study of great orators and their productions. Preparation and delivery of original orations. To achieve the best results a student must have a knowledge of rhetoric, logic, psychology and English literature. Lectures and class drill. Open to Juniors and Seniors who have completed Public Speaking 1, 2. 2 hrs., both semesters. 3 units.

SOCIOLOGY.

MR. RUTHRAUFF.

SOCIOLOGY 1. ELEMENTS OF SOCIOLOGY—A study of the characteristic concepts of sociological thought designed to acquaint the student with the current theories of social interpretation, the conditions of social progress. Fairbank's Introduction to Sociology will be used as a guide, and supplemented by lectures, collateral reading, and reports. Open to Juniors and Seniors. 3 hrs., first semester. 2 units.

SOCIOLOGY 2. CHARITIES AND CRIME—A consideration of social pathology, including an examination of the origin and nature of the dependent, defective, and

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*To be omitted 1905-6.

delinquent classes. A study will be made of the principles and methods of relief; causes of crime; prison systems; juvenile offenders; preventive measures, etc. Guide "Warner's American Charities". Prerequisite, Sociology 1. 3 hrs., second semester. 2 units.

SPANISH.

ASSISTANT, PROFESSOR TURRELL

SPANISH 1, 2. First Semester: Hills and Ford's Spanish grammar complete. Second Semester: "Cuentos Castellanos" (Carter and Malloy), Alcarcón's "El Capitán veneno," or "Novelas escogidas," etc. Composition, dictation and oral work. 5 hrs., both semesters 8 units.

SPANISH 3, 4. First Semester: Composition and Syntax. Reading of Galdós' "Marianela," Alarcón's "El Niño de la Bola," or "El Final de Norma." Second Semester: Valdes,' "José," Galdós' "Doña Perfecta," Valera's "Pepita Jiménez." Lectures in Spanish on the history of Spanish literature. 5 hrs., both semesters. 8 units.

SPANISH 5. The classical Spanish drama. Study of the age of Lope de Vega and Calderón. Reading of Lope's "La Estrella de Sevilla," Calderón's "La Vida es Sueño," and "El Mágico Prodigioso." 3 hrs., first semester. 3 units.

SPANISH 6. Recent Spanish literature, with particular study of the modern drama. Reading of Hartzenbusch's "Los Amantes de Teruel," Echegaray's "Ó Locura ó Santitad," and "El Gran Galeoto," Larra's "Partir á Tiempo," Nuñez de Arce's "El Haz de Leña" Galdós' "Electra," etc. 3 hrs., second semester. 3 units.

SHORT COURSE OF INSTRUCTION IN MINERALOGY AND ASSAYING.

In order to meet the needs of persons who desire to learn the art of assaying the common ores and who have not the time required for a full four years' course of study, the Board of Regents has approved a short course of instruction in practical assaying, mineralogy, metallurgy, and allied subjects,

This course commences with the first semester in each year and requires at least two years. Students are advised, however, to take the regular course in engineering and mining, if possible, since in two years they cannot expect more than to make a beginning in these subjects.

REQUIREMENTS FOR ADMISSION

Those desiring to take this course are required to be at least eighteen years of age, to have good health, and to have a knowledge of English, physics and algebra to quadratics, sufficient to enable them to pursue the course with advantage. This knowledge will be tested by examinations.

The fees and tuition are the same as for other departments. (See p. 20.) Each student is required to pay the cost of materials, glassware, and apparatus used by him. For this purpose a deposit of ten dollars will be required in advance each semester and any balance will be refunded.

The right is reserved to vary this course according to the aptitudes or necessities of those concerned.

FIRST YEAR.

General Chemistry, one semester.

Qualitative analysis, one semester.

Mathematics, two semesters.

English or Spanish, two semesters.

Practical free-hand drawing and shopwork, or physics, two semesters.

SECOND YEAR.

Mineralogy and blow-pipe analysis, two semesters.

Assaying, one semester.

Qualitative analysis and wet assaying, one semester.

Mathematics, two semesters.

Geology, two semesters.

BUREAU OF MINES AND ASSAYING.

A separate department of the School of Mines, under the name of "The Bureau of Mines and Assaying" has been established to receive and work ores, and to make assays and analysis of ores, minerals, mineral waters and petroleum.

In accordance with the act of the Legislature of the Territory, approved March, 1897, and amended in March, 1899, assays of ores and minerals are made for the prospectors and miners of Arizona, and for others, at fixed rates established by the law, and tabulated below. To meet the requirements of this work a special laboratory building of brick has been erected and maintained. It is fitted up as a complete assay office, and is provided with a double large brick coke-furnace, a melting furnace and gasoline furnaces in a fire-proof room. There are in addition, a parting and wet assay room, a balance room, and office, as shown upon the accompanying plan.

Extreme accuracy and excellence of work are considered of more importance than pecuniary profits. All assays are made in duplicate and if not accordant are repeated. A special expert assayer is employed, and the assays are not made by students, who receive their instruction in the regular laboratories of the University.

The money received for assaying is deposited monthly to the credit of the assay fund which is used to pay the assayer and the cost of materials and apparatus.

SCHEDULE OF RATES.

In accordance with the Legislative enactment approved March 3, 1899, the rates for assaying heretofore in force under the law of 1897, have been changed. The fifty-cent rate is no longer in force. Former circulars and schedules of rates are revoked and withdrawn. Under the provisions of the new laws, the Regents of the University of Arizona have established the following rates for assaying ores.

ASSAYING ORES FROM ARIZONA.

Silver and Gold, or either	$1.00
Silver, Gold and Copper	2.00
Copper	1.00
Lead	1.00
Zinc	1.00
Iron	1.00
Gold, Silver, Copper and Lead	2.50
Gold, Silver, Copper and Iron	2.50
Gold, Silver, Copper and Zinc	2.50

ASSAYING ORES FROM WITHOUT THE LIMITS OF ARIZONA.

Silver and Gold, or either alone	$1.00
Copper	1.00
Lead	1.00
Zinc	2.50
Iron	2.00
Silica	1.50
Alumina	5.00

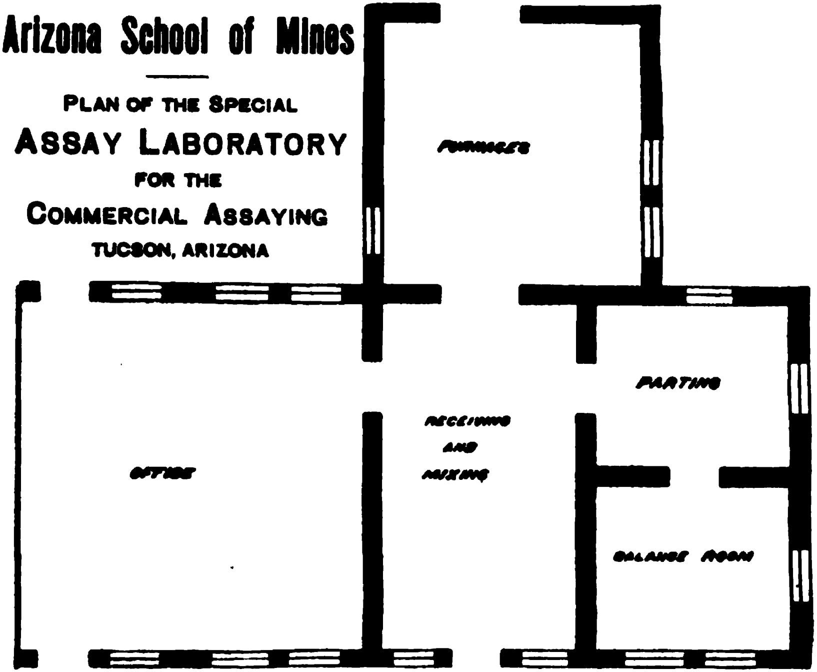
And for other determinations and analytic work such rate as the Director of the School of Mines may in each instance fix.

PAYMENT IN ADVANCE REQUIRED

The Director is required, in all cases, to hold the assay until the fee or charge therefore is paid. Remit-

Arizona School of Mines

PLAN OF THE SPECIAL
ASSAY LABORATORY
FOR THE
COMMERCIAL ASSAYING
TUCSON, ARIZONA



tances may be made by check or money order; or the money, securely wrapped, may be sent with the sample.

RATES FOR SAMPLING AND WORKING ORES

Lots of 100 pounds or less, including assays of three metals	$ 5.00
Each additional 100 pounds, to 500 pounds	1.00
Over 500 pounds to 1 ton	10.00
Each additional ton	4.00
Ordinary stamp mill test and plate amalgamation for first ton or fraction of a ton	20.00
From 1 to 2 tons	30.00
Pan amalgamation, including crushing and assays, ton	20.00

Large lots proportionately less; small lots more in proportion.

CYANIDE PROCESS.

The School of Mines is prepared to make experimental tests of ores and tailings by the cyanide process, in large or small quantities, at rates to be agreed upon with the Director.

Working tests and experiments by other processes may be undertaken at rates to be agreed upon in each instance, depending upon the amount of materials, time and labor required

CONCENTRATING (INCLUDING ALL ASSAYS).

Wet or dry test of small lot (under 500 pounds)	$15.00
500 pounds to 1 ton	20.00
Each additional ton	7.00

GRATUITOUS QUALITATIVE TESTS.

The determination of the nature of rare and peculiar minerals, not requiring a chemical analysis, or an assay, is made gratuitously. Samples sent for this purpose should be in their original condition as broken out, and not crushed to a powder or pulp. Tests requiring determinations of the presence of gold or silver must be paid for at assay rates. Samples may be sent by mail at the rate of one cent per ounce. They should be distinctly labeled inside the package with the name of the sender, and a letter should be posted at the same time giving the full name and address, and inclosing a stamp for the reply. This offer of free examination is intended to apply to minerals unknown to the sender and does not cover special tests for precious metals or for any metal the presence of which is usually determined by an assay.

BULLION ASSAYS.

Special attention is given to the retorting and melting of bullion and the assays of gold bars for shipment.

ANALYSIS OF WATER.

The Bureau is prepared to undertake the analysis of ordinary or mineral waters.

HOW TO SEND SAMPLES.

For small samples, under four pounds in weight, the most expeditious and cheapest way is to send by the ordinary mail. The express company does not deliver parcels at the University, hence delay often results from sending by express. Delays also result from the want of identification. Sometimes the only clue to the name of the sender is the comparison of the handwriting upon the sample and that upon the letter. The postal laws permit the name of the sender to be written and inclosed in the package. Each sample should be labeled by a slip of paper, inside, giving the name and locality of the claim and the name of the sender.

The name of the claim is desired in order that the value and distribution of the mineral wealth of the Territory may be better known.

Special rates for freight on consignments to the "Director of the School of Mines," are granted by the Southern Pacific railroad from points in Arizona. Ask the agent at shipping point for particulars.

All business communications, checks and money orders should be addressed to the

ARIZONA SCHOOL OF MINES,
KENDRIC C. BABCOCK, Pres.
Tucson, Pima Co., Arizona.

THE AGRICULTURAL EXPERIMENT STATION.

STATION STAFF.

Kendric Charles Babcock,
President of the University.

Robert H. Forbes, M. S.	Director and Chemist
Vernon A. Clark, B. S.	Agriculturist and Horticulturist.
	Animal Husbandman
John James Thornber, A. M.	Botanist
Henry B. Slade, A. B.	Associate Chemist
T. D. A. Cockerell	Consulting Entomologist
John W. Lewis	Secretary to the Director

ORGANIZATION AND WORK.

The Agricultural Experiment Station is a legally constituted department of the University, whose purpose is "to aid in acquiring and diffusing * * * useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and applications of agricultural science."

With the above objects in view, the organization of the Station includes the departments of administration, agriculture and horticulture, animal husbandry, botany and chemistry, the whole or a major portion of the time of one or more members of the Station staff being devoted to each department of the Station work. Provision is made for meteorological and entomological work also, though to a less degree.

Owing to the wide variation in agricultural conditions in Arizona, it has been found of advantage to distribute the work so that each department is located, so far as possible, in the station most favorable to the accomplishment of its own special results. According to this principle, the various lines of Experiment Station work have been distributed as follows:

The Director's office and the departments of botany and chemistry are maintained at Tucson in the University buildings. Through this arrangement, the Experiment Station profits by the buildings and libraries of the University, while the University is benefited from time to time by the teaching ability of members of the Station staff. It has been found that from this base of operations the three great agricultural districts of the Territory—Salt River valley, the lower Colorado, and the upper Gila—are accessible with equal convenience for field work and observations.

On the same grounds—fitness of location for the work undertaken—the Experiment Station farm has been maintained and strengthened at Phoenix. Salt River Valley is intermediate in elevation, in situation, and in mean yearly temperature between the the other two important farming districts above mentioned, and for this reason the agricultural and horticultural results obtained there are capable of the most general application in the Territory at large.

On the same principle again, the date palm orchard, conducted in cooperation with the United States Department of Agriculture, is located in the alkaline district south of Tempe, where a successful demonstration of this palm as a commercial fruit producer will be of the greatest value, creating use for great areas of alkaline land in the arid Southwest. Another orchard has just been planted on a tract near Yuma.

The range station also, for the study of worn-out range country with a view to its reclamation to usefulness, is located in a typical district near Tucson, and is conducted under the auspices of the department of botany, co-operating with the United States Department of Agriculture.

The services of specialists in various subjects, such as entomology, meteorology, and soil survey work have also been secured from time to time.

The results of the Experiment Station work are made public at frequent intervals in the bulletins and reports of the Station. These publications are made in two series: first, the longer and more technical bulletins, stating in considerable detail the investigations as they mature, and secondly, the "Timely Hints for Farmers," which are brief writings issued at the time when they will be most useful, written in plain language, and presented in popular form. The annual reports also are for the most part written popularly, and afford a convenient and reliable summary of each year's work as it comes to completion.

The Experiment Station work conducted and published on the lines indicated above has a two-fold value. In the first place, the suggestions made or derived from the investigations of the Station are of direct material profit to the agricultural public and are intended to be immediately applied to advantage in the betterment of agricultural practice. In the second place, these writings are intended to serve an educational purpose, inasmuch as they are so presented as to constitute lesson sheets for the benefit of the careful reader. It may therefore be considered that the Experiment Station reaches a class of some thirty-five hundred readers in the Southwest at frequent intervals by means of its "Timely Hints" and other publications. The operations of the range study tract at Tucson, the Experiment Station farm at Phoenix, the date palm orchard at Tempe, and the sugar beet plots on the upper Gila serve also as an object lesson to the adjacent public.

It is believed that this distributed and mobile organization is especially effective, not only for the purposes of the Experiment Station, but also for those of the University as well, since it allows the Station to conduct its work in localities suitable for the accomplishment of results; and again, it causes the public to become better acquainted with the Territorial University, of which the Station is a department.

An appropriation of eleven thousand dollars, made for the use of the Station by the Twenty-second Legislature, very satisfactorily attests the estimation in which the work of the Station is held. This appropriation is intended for the improvement of the date orchard; for purchasing livestock and buildings for the farm, and for issuing publications and holding farmers' institutes and short courses of instruction throughout the Territory.

Provision therefore, is made for the symmetrical development of this work in the Territory, both experimentally and educationally; and, prospectively, "the farmers' college" bids fair to increase in usefulness to the growing agricultural interests of the Territory.

SUB-COLLEGIATE DEPARTMENT.

INSTRUCTORS.

KENDRIC CHARLES BABCOCK Ph. D., President, Civics.

DAVID HULL HOLMES, B. S., Shopwork and Drawing.

JOHN JAMES THORNBER, A. M., Botany, Biology.

CHARLES A. TURRELL, A. M., French, German Spanish.

SIDNEY CARLETON NEWSOM, A. M., English.

ORIN ALBERT KATES, Physical Training.

LIEUT. SAMUEL V. McCLURE, Military Science and Tactics.

HATTIE FERRIN, B. S., English, Latin.

MABEL GRAY HOOVER, Domestic Science.

MARION CUMMINGS STANLEY, B. A., Latin.

JOHN WILLIAM GORBY, A. M., Public Speaking, Greek, English.

WILLIAM M. RUTHRAUFF, A. B., History.

GLENN A. WILCOX, B. S., Science.

IVAN DE LASHMUTT, B. S., Chemistry.

GEORGE MARK EVANS. Ph. B., LL. B., Mathematics.

ESTELLE LUTRELL, A. B., English.

FREDERICK E. TALMAGE, B. S., Bookkeeping, Stenography, Typewriting.

WILLIAM ANGUS, Mathematics.

GENERAL INFORMATION.

In this department the University offers the work of a well-organized high school, with the added advantages of shopwork and drawing and of domestic science. The general library and the gymnasium are open to all students in this department.

The equipment of the scientific laboratories is available for use in this sub-collegiate work, whenever it can be used advantageously, and makes possible strong work in elementary science. The instructors in this department are assisted by the professors of the college departments, several of whom regularly conduct sub-collegiate classes. By reference to the course of study which follows, it will be seen that it offers a comprehensive training for those who may not be able to pursue their studies farther, while it gives a good preparation for college.

ADMISSION.

Admission to regular standing in the first year of the sub-collegiate course presupposes the completion of the work of the eighth grade of the public or parochial schools. Students who do not bring certificates showing the completion of this work, must take examination to test their ability to pursue profitably the work of the first year.

All students entering the preparatory department will be required to take an examination in oral reading. To remedy notable deficiency in this subject, the University will require extra work in addition to other studies.

In all cases in which the preparation of a student in a particular subject proves to be deficient, the University reserves the right to require the student to secure at his own expense the help of an approved coach until the deficiency is remedied.

COURSE OF STUDY.

The following course of study will be required of all students who fit themselves at the University for entrance to the Freshmen class in 1905. Such variations from it will be made during the next year as will adapt it to the case of students already in the sub-collegiate department.

Military drill is required of all able-bodied male students throughout the course. Physical training is required of all students, unless they are excused by the President upon presenting a certificate from one of the University physicians. The young men have drill three times per week and exercise in the Gymnasium twice. The young women have physical culture three times a week.

The language begun in the second or third year must be pursued for at least two years in order to secure credit toward graduation.

While the subjects are for convenience grouped by years in the following schedule, yet the departmental method will be followed. In the description of courses following, the subjects are arranged by groups or departments in the consecutive order in which they are taken up and students will be required to take them in this order. Aside from this sequence the ability of each student must determine what subjects are pursued at any given time, due regard being given to the proper balance of subjects. The wishes of parents will always be given careful consideration in making up the schedule of work for each student, but the final decision in the matter must rest with the committee on registration, which is composed of persons who have had long experience in secondary and collegiate teaching. Individual attention will be given to the needs of each student.

To each student who completes the studies of this course, a certificate stating that fact will be given, which certificate will entitle the holder to admittance to the University courses of instruction without examination.

FIRST YEAR.

(The figures represent recitations per week).

English	5	Physical Geography	3
Algebra	5	Drawing and shop-work or Domestic Science	5
Greek and Roman History	2		

SECOND YEAR.

English	5	*French (first year)	5
Algebra	5	*Spanish (first year)	5
European History	4	*Drawing and shop work or Domestic Science	5
*Latin	5	*Bookkeeping (7 hours)	
*German (first year)	5		

THIRD YEAR.

English	5	*French (second year)	4
Plane Geometry	5	*German (first year)	5
*Chemistry	5	*German (second year)	4
*Drawing and Shop work	5	*Spanish (first year)	5
*Latin (Second year)	4	*Spanish (second year)	4
*Greek (first year)	5	*Public Speaking	3
*French (first year)	5	*Stenography (8 hours)	

FOURTH YEAR.

English	5	*Greek (second year)	4
Civics	3	*French “ “	4
Physiology	2	*German “ “	4
*Solid Geometry and Algebra	4	*Spanish “ “	4
*Physics	5	*Public Speaking	2
*Latin (third year)	4	*Parlimentary Practice	1
		*English History	4

*Subjects thus marked are elective. One elective must be chosen in the second year. In the third year and in the fourth year, electives making up at least nine hours must be chosen.

ENGLISH.

The English of the sub-collegiate course is based upon what are known as the entrance requirements of New England colleges. The work is in general divided into three parts: classics, studied in class, composition and grammar work done partly in class and part outside, and supplementary reading done largely outside the class-room. All these parts of the work may be carried on at the same time, as the circumstances of the class seem to require, the classics and supplementary reading forming the basis of a large part of the work in grammar and composition. Throughout the course, however, a primary aim is to develop the student's individual power of expressing himself in words. The time allotted to these three phases of English varies from year to year, increasing attention being paid to the appreciative and critical faculty as the course advances. In the fourth year a brief outline history of English and American literature occupies about one-third of the year's work in English.

The four years' sub-collegiate English is conducted under the following general outline. Five hours each week are given to English throughout the course.

Selections from the following list are made at the discretion of the teacher, preference being given to the New England College Entrance Requirements, which are marked by an asterisk *

FIRST YEAR.

One half of the time is devoted to the study of English Grammar and Composition.

CLASSICS. Longfellow's Tales of a Wayside Inn, Bryant's Water Fowl, Planting of an Apple Tree, Forest Hymn, The Antiquity of Freedom, Lowell's Shorter poems, Tennyson's Enoch Arden, Miller's Daughter.

SUPPLEMENTARY READING. Scott's Talisman, Hughes' Tom Brown at Rugby, Cooper's Last of the Mohicans, The Spy, Hale's A Man Without a Country, Hawthorne's The House of the Seven Gables, Howells' A Boy's Town.

SECOND YEAR.

COMPOSITION AND GRAMMAR. As in first year with attention to figures of speech, reproducing the work of classic authors, elementary etymology, exercises in exposition, narration and description.

CLASSICS. *The Vision of Sir Launfal, *The Ancient Mariner, and The Ballad Book (Bates), and *The Idylls of the King, studied as in first year.

SUPPLEMENTARY READING. Deserted Village, Lorna Doone, selections from Burroughs, Quentin Durward, The Cricket on the Hearth.

THIRD YEAR.

Composition and Rhetoric are continued with emphasis on elementary argumentation and exposition.

CLASSICS. Julius Cæsar, *The Merchant of Venice, The Princess, *Sir Roger de Coverly, Poems of Burns, Carlyle's Essay on Burns. These are for general reading as in the first and second years. For careful reading are the following: *Milton's L'Allegro, Il Penseroso, Comus, Lycidas, Macaulay's Essay on Milton. Special attention will be given to the author, his times and surroundings, and his style.

SUPPLEMENTARY READING. Sesame and Lilies, Backlog Studies, Treasure Island, Kidnapped.

FOURTH YEAR,

COMPOSITION AND GRAMMAR. Exercises in narration and description for flexibility and ease of expression and general preparation for entrance requirement "b" on page 33 of this Register.

CLASSICS *Burke's Speech on Conciliation, Macaulay's *Life of Johnson, Essay on Addison, *Macbeth. These are all for thorough study.

HISTORY OF ENGLISH LITERATURE. From the earliest times, with text-book as guide, with a review in chronological order of the classics studied during the four years of the course, to prepare for examination in entrance requirement "a" on page 32 of this Register. Special attention is paid to Keats, Shelley, Tennyson and other representative poets of the nineteenth century.

SUPPLEMENTARY READING. Our Old Home, Making of an American, The Newcomes, Oliver Twist, American Orations and Addresses.

MATHEMATICS.

In algebra special attention is given to the transition from arithmetic to algebra, to the fundamental operations and especially to factoring. The course includes as much as is found in any good text-book of the algebra through quadratic equations.

Plane geometry occupies the third year. This is so taught as to develop orderly habits of thinking and of investigation. To that end much original work is required, including practical problems involving the application of the principles learned.

Solid geometry and the completion of the algebra through occupy the fourth year.

MECHANIC ARTS.

This work consists of both drawing and shop work, between which subjects the students time is about equally divided. The course covers three years and is designed to furnish a thorough elementary knowledge of manual training as taught in the sub-collegiate schools of the country.

FIRST YEAR. Drawing—Freehand sketching in perspective and orthographic projection. Reinhart's lettering, free-hand working drawings.

Shop-work—"Sloyd," including wood-carving, care and use of wood-working tools.

SECOND YEAR. Drawing — Mechanical drawing, geometrical problems, first seventeen problems in Church's descriptive geometry.

Shopwork—Forging, joinery, wood-turning.

SCIENCE.

It is the object of the courses in science to initiate the student into the processes and methods used in laboratory work; to teach close observation, careful manipulation and logical deduction; to acquaint the student with the fundamental facts of the various branches of science and to give full practice in the use of good English in describing various observations and experiments. To insure better results in the notebooks, they will all be passed upon by one of the instructors in English.

PHYSICAL GEOGRAPHY. This course, combining the laboratory method with the text-book, aims to give the pupils training in exact observation of familiar phenomena, like distance, weight, pressure of liquids and gases, temperatures, winds, clouds and the habits of plants and animals. The natural forces producing erosion, formation of soils and rocks, the processes of nature as seen in seed germination and plant growth (with demonstrations with the microscope) will be discussed, with frequent experiments and field excursions.

CHEMISTRY. A year's work with the text and in the laboratory.

PHYSICS. A thorough course consisting of three recitation periods and four laboratory periods per week, carried along the lines laid down for the senior year in secondary schools.

PHYSIOLOGY. This course aims to combine careful laboratory instruction, with application of the knowledge to practical personal hygiene. This work will be coordinated with that of the department of Physical Culture. For part of the instructions the young men and women will meet in seperate sections.

DOMESTIC SCIENCE.

The course in domestic science for young women is arranged to give instruction in the science and art of home economics, and to raise home making to a higher plane. It includes all branches of home science, hygiene, chemistry of cooking and cleaning, preparation of all food stuffs, both fancy and elementary, nursing and food for the sick, marketing, and the management of servants.

Two courses are offered in sewing. The first year includes fancy needle work, and the second year drafting, cutting and dressmaking. The course includes laundering of laces and ribbons.

Social duties and customs of society are considered with peculiar care. The students have access in the domestic science library to all the best authorities.

HISTORY

The aim of the work in history is to lead the pupil to see the development of races and nations along political, social and religious lines and to arouse in him a love for the subject and a habit of broad and discriminating reading.

The work of the first year will consist of a survey of the development and characteristics of the Greek and Roman civilizations. A text such as Wolfson's or West's will be supplemented by collateral reading and a notebook.

The work of the second year includes mediaeval and modern history. The aim is to give the student an idea of the essential unity of history and the leading facts in the political development of races and nations. Adams' European History is used, supplemented by the reading of references contained therein.

Hart's "Actual Government" is the text-book in civics. The historical development of the subject is made prominent while practical problems, such as taxation and municipal government, are made the subjects of special investigation and study.

Coman and Kendall's or Larned's History of England is used as the text-book in the fourth year.

LATIN, GREEK, FRENCH, SPANISH AND GERMAN

For an outline of the courses in Latin and Greek see page 34, under requirements for admission.

For an outline of the courses in French, Spanish and German see pages 50, 52 and 68.

BOOKKEEPING AND COMMERCIAL PRACTICE.

Bookkeeping is taught by the modern budget system. The work is individual and each student may progress as fast as his time and ability permit. The course is thorough in all the details of office practice. Students are made familiar with different filing cabinets, the filing of letters, the use of card ledgers, the copying and indexing of letters and bills in copy books. The course includes instruction in commercial law, with special emphises laid on the ordinary forms of commercial paper and the different endorsements. The department is equipped with the latest vertical files, cabinets, letter press, and office sundries. All students in bookkeeping are required to take some other branch of mathematics and must show proficiency in English.

STENOGRAPHY AND TYPEWRITING.

A complete course in stenography is offered. The Gallagher-Marsh system, a system which has received the highest endorsement ofleading court reporters on the Pacific Coast and which has been adopted by the Boards-of Educations in the largest cities of California, has recently been adopted. The amount of time allotted for this work has also been increased from five hours to eight hours per week. The object of the course is to train students so that they may become practical stenographers. With this end in view particular stress is laid upon neatness, filing, copying, and indexing. This branch of the commercial department is equipped with up-to-date filing cases, office sundries, and six typewriters, four of which are Remingtons, and two the L. G. Smith Visible. All of the typewriters are new with the exception of one. Students taking this work are required to have had one year of English, and to take English with this course.

ALUMNI ASSOCIATION.

The Alumni Association of the University of Arizona was organized on the second day of June, 1897.

The object of this society as expressed in its constitution is: "To promote the interests of the University to secure unity among its graduates and to foster an attachment to our Alma Mater."

Concerning the last two clauses of this declaration it may be said that the organization is carrying out their meaning in a manner which leaves little if anything to be desired. There is no doubt regarding the loyalty of of the graduates to the University of Arizona and no question of their unanimous desire for the prosperity of the institution.

The first clause of the above declaration, however, deals with a matter which in a sense admits of more growth than those just mentioned, and the members of the association realize that there is room for further progress in the accomplishment of this purpose.

In the past the alumni organization has been small in numbers and efforts to "promote the interests of the University" have necessarily been somewhat feeble. As however, the membership is now fairly large and will be considerably augmented in yearly is the conviction of the alumni that the time has come for more clearly defined and decisive work in behalf of our Alma Mater.

So far the activity of the society has been shown in two ways. First by assuming charge of the work of securing suitably framed photographs of the members of the graduating classes, from year to year, and presenting these to the University for preservation on its walls, thus forming a pictorial record of the work of the institution. Secondly, by giving an annual banquet at Commencement to the graduates and members of the faculty, thereby creating a fraternal feeling between the old and new members of the association and also keeping the instructors and graduates in touch with each other from year to year. However commendable and important these enterprises may be it is the belief of the society that now with numerous members scattered throughout Arizona actively engaged in the industries, arts and sciences the time has come to take up additional work.

The members of the association realize that there yet are many people in the Territory who are not fully aware of the educational opportunities afforded by the University. Some of these are sending their children to other States to receive an education which might be obtained equally well in this Territory. It should be realized that the more the people patronize their own institution the better will become the courses which it can offer. In one sense the degree of development of the University depends only on the measure of support given to it by the citizens of the Territory.

Another feature which is commended to the careful consideration of our wealthy citizens is that the University of Arizona has not one cent of endowment. Through the generosity of one of the largest mining companies in Arizona the institution has received two substantial gifts of money to aid in the erection and furnishing of buildings, but other than this nothing has been received from private individuals. Institutions to the east and west of us have endowments of thousands of dollars; why should not the University of Arizona be endowed also?

In pursuance of the foregoing lines of thought it will be the aim of the alumni association to endeavor to create a deeper feeling of interest and pride in the University of Arizona among the people of the Territory.

1895

Charles Oma Rouse, B. S., Superintendent of Schools, Pima County, Tucson, Arizona.

Mercedes Anna Shibell, B. S., (Mrs. A. J. Gould), Tucson, Arizona.

Mary Flint Walker, B. S., (Mrs. Pearl Adams), Benson, Arizona.

1897

Edward Marshall Boggs, C. E. (nunc pro tunc) Chief Engineer Oakland Electric Railways, Oakland, Cal.

Clara Cramond Fish, B. S., Tucson, Arizona.

George Ojeda Hilzinger, B. S., Teller in Bank, El Paso, Texas.

Mark Walker, B. S., Metallurgist, Tombstone, Arizona.

1898

Hattie Ferrin, B. S., Instructor in University of Arizona, Tucson, Arizona.

Granville Malcolm Gillett, B. S., Draughtsman in Surveyor General's Office, Phoenix, Arizona.

Minnie Watts, B. S. (Mrs. W. B. Smith), Altaville, Cal.

John Desha Young, B. S.
Died April 8, 1899.

1899

Robert L. Morton, B. S., Assayer, Yuma, Arizona.

1900

Ida Clarissa Flood, B. S., (Mrs. G. Dodge) Oakland, Cal.

Samuel Pressly McCrea, B. S., A. B., Teacher of High School, San Jose, Cal.

Charles Pierce Richmond, B. S., Cyanide Manager, La Union, Salvador, Central America.

Florence Russell Welles, B. S., (Mrs. Wm. Angus), Tucson, Arizona.

1901

Rudolph Castenada. B. S., Surveyor, Tucson, Arizona.

Clara Ferrin, B. S., Teacher, Tucson, Arizona.

George Millard Parker, B. S., Denver, Colo.

David Hull Holmes, B. S., (nunc pro tunc) Professor of Mechanic Arts and Drawing, University of Arizona, Tucson, Arizona.

1902

Andrew Gilbert Aiken, A. B., B. S., Surveyor, Canton, New York.

Moses Blumenkranz; B. S., Asst. Supt. Shannon Copper Company, Metcalf, Arizona.

Ruth Brown, Ph. B., Teacher, Tucson, Arizona.

Felix Grundy Haynes, B. S., Casa Grande, Arizona.

Rosa Belle Barrott, Ph. B., Teacher, Roseburg, Oregon.

Philip Matthew Reilly, B. S., Assayer, La Cananea, Sonora, Mexico.

Bertram L. Smith, B. S., Surveyor and Assayer, Mayer, Arizona.

Bessie Smith, Ph. B., Teacher, Tucson, Arizona.

Walter James Wakefield, Assayer, Tucson, Arizona.

1903

Richard Lamar Drane, B. S., Assistant Engineer, A. E. R. R. Tucson, Arizona.

George Mark Evans, LL. B., Instructor in University of Arizona, Tucson, Arizona.

Leslie Alexander Gillett, B. S. (Mining), Draughtsman, in Surveyor General's Office, Phoenix, Arizona.

Georgia Ann Holmesley, Ph. B., Clifton, Arizona.

Edward Horton Jones, B. S., Assayer, Magdalena, Sonora, Mexico.

John Williard Prout, Jr., B. S., Superintendent Mowery Mine, Patagonia, Arizona.

Thomas Edward Steele, B. S., Assayer, La Cananea, Sonora, Mexico.

1904

William Burnham Alexander, B. S., County Surveyor, Pima County, Tucson, Arizona.

Elbert John Hollingshead [Kimble] B. S., Teacher, Brownsberger School, Los Angeles, Cal.

Frank Caleb Kelton, B. S., Surveyor, Tucson, Arizona.

Estella Markham Prout, Ph. B., Denver, Colorado.

John Williard Prout, Jr.; B. S. (Mining). See 1903.

MILITARY ORGANIZATION 1904-5.

UNIVERSITY OF ARIZONA CADET BATTALION,

NATIONAL GUARD OF ARIZONA.

Commandant of Cadets	Lieutenant S. V. Mc Clure, U. S. A.; Major, N. G. A.

STAFF.

Adjutant	First Lieutenant J. Elmer Johnson.
Quartermaster	Second Lieutenant John S. Brown.
Sergeant Maor	William F. Drew.

COMPANY A.

Captain	Hugh M. Wolflin.
Second Lieutenant	Albert R. Buehman.
First Sergeant	Burrell R. Hatcher.
Sergeant	Andrew P. Martin.
Sergeant	Sheldon A. Reed.
Corporal	Charles O. Brown.
Corporal	DanAngius.
Corporal	Frank W. Rose
Corporal	Harold D. Steinfeld.

COMPANY B.

Captain	W. Scott Osborne.
Second Lieutenant	William J. Pew.
First Sergeant	J. Clyde Hoyt.
Sergeant	Robert B. Murphey.
Sergeant	Fletcher M. Doan.
Corporal	Lynne F. Hazzard.
Corporal	Clifford H. Cassiday.
Corporal	Thomas S. O'Connell.

TRUMPETERS

Corporal	Horace R. Holbrook.
Private	Sidney F. Mashbir.
Private	Max M. Henley.
Private	Julian Huddleston.
Private	Carlos Castaneda.

REGISTER OF STUDENTS.

1904-05.

POST GRADUATE STUDENTS.

Drane, Richard Lamar, B. S. Univer. of Ariz., Engineering	Tucson
Evans, George Mark. Ph. B. Univ. of Ariz., Mathematics and Chemistry	Tucson
Ferrin, Clara, B. S. Univ. of Ariz., German	Tucson
Meek, James Thomas, A. B. Arkadelphia Methodist College, Mathematics	Roosevelt
Murphey, Carobel, A. B. Cox College, Botany,	Tucson
Williams, David Carl, B. L. McMinnville College, Economics and Philosophy	Tucson

SENIORS—4.

Ganz, Sylvan Cleveland	Phoenix
Mead, Roy Gibbons,	Tucson
Norway, Ora Elinor,	Tucson
Reid, Ida Christina	Tucson

JUNIORS—4.

Bateman, Ralph Lowell,	Fort Grant
Bonillas, Ygnacio Safford,	Nogales, Mexico
Kilgore, Roy Bartley,	Williams
Wooddell, Minnie Louise,	Tucson

SOPHOMORES—9.

Brown, Harriet Estella	Tucson
Crable, Francis Drake	Tombstone
Moore, Roy Webb	Tucson
Purcell, Weda Ina	Tucson

Osborn, Winfield Scott	Phoenix
Pierson, A. Romeyn, Jr.	Glen Ridge, New Jersey
Samuels, Kathryn	Tucson
Walker, Leland Ross	St. Louis, Mo.
Wolflin, Hugh Maupin	Tucson

FRESHMEN—8.

Fitch, Constance	Tucson
Holbrook, Horace Rolland	San Bernardino, Cal.
Moore, Leon G.	Tucson
Murphey, Robert Bivins	Phoenix
Ruthrauff, John Mosheim	Tucson
Scow, Oliver	Dos Cabezas
Williams, Edwin Eugene	Sandusky, O.
Wooddell, Charles Edward	Tucson

UNCLASSIFIED—COLLEGE—8.

Angus, William—Engineering and Chemistry,	Tucson
Babcock, Frances Myra—English and French,	Tucson
Bradford, Hubert—Assaying Course,	Tucson
Brostrom, William—Metallurgy,	Tucson
Jacobus, Mrs. Preston N.—Spanish,	Tucson
Lowrie, Phoebe—Spanish and Economic,	Tucson
Wilcox, Mrs. Emma Kester—English and Economics,	Tucson
Willson, Martha Edna—English	Tucson

SUB-COLLEGIATE—FOURTH—18.

Brown, John Stephenson	Tucson
Brown, Clara Agnes	Tucson

*Buehman, Albert Rex	Tucson
Childs, Ruby Claire	Chicago, Ill.
*Doan, Fletcher M., Jr.	Florence
*Drew, William Franklin	Mesa City
Francis, Mary Agnes	Tucson
*Hatcher, Burrell R.	Douglas
*Johnson, Joel Elmer	Mesa City
Kane, Mae Dolores	Tucson
La Baree, Grace Ysabel	Berkeley, Cal.
*Mellgren, Walter Give	Tombstone
Pease, Ione Gertrude	Tucson
*Pew, William James	Mesa City
Rogers, Pauline	Tucson
Stewart, Jesse Hobson	Mesa City
White, Edward Willard	Tucson
Wilkerson, Mabel	Yuma

SUB-COLLEGIATE—THIRD—23.

Angius, Daniel	Bisbee
Brown, Charles Owen, Jr.	Tucson
Carpenter, Leslie Lucile	Tucson
Cole, Rena Ann	Fort Lowell
Culley, Edith Emily	Tucson
Erb, Aimee Myrtle	Yorktown, Texas
Evans, Evelyn Mamie	Tucson
Grossetta, Warren Arthur	Tucson
Hazzard, Lynne Franklin	Tucson
Hoyt, Joseph Clyde	Jerome
Kohler, George William	Tucson
Leslie, Beppie Lee	Tucson
Martin, Andrew Philip	Tucson

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*Permitted to register in at least one freshman subject.

McNelly, Benjamin Arthur	Globe
Moore, Sylvester Archie	Tucson
O'Connell, Thomas Sarsfield	Tucson
Post, Anita Calneh	Yuma
Reed, Sheldon Alanson	Tucson
Scholefield, Helen Mar	Tucson
Samuels, Agnes Huntington	Tucson
Soto, Rafaela Augusta	Wilcox
Steinfeld, Harold Donau	Tucson
Tonkin, Ruth Anna	Tucson

SUB-COLLEGIATE—SECOND—47.

Adams, David Lee	Dragoon
Angius, John	Bisbee
Bernard, Edwin Price	Tucson
Cassiday, Clifford Harry	Tucson
Cheyney, Mary Neal	Tucson
Clark, Florence Elsie	Bisbee
Coleman, Mabel May	Tucson
Contraman, Robert William	Tucson
Conwell, Albert Lee	Douglas
Dannemiller, Charles Raymond	McCabe
Detloff, Albert John	Bisbee
Donnelly, Albert Francis	Tucson
Drachman, Myrtle Augustine	Tucson
Duffy, Mary Margarite	Tucson
Elster, Lulu Louise	Tucson
Estabrook, Ethelind May	Tucson
Ford, Emmet Tomlinson	Tucson
Francis, Margaret Elizabeth	Tucson
Goldtree, Estella Esther	Tucson
Gorby, Eva	Tucson
Gregory, Minnie Hortense	Tucson

Gungl, Edward Joseph	Fort Huachuca
Henley, Max Morrell	Quijano, Mex.
Hoeffer, Albert Herbert	Hermosillo, Mex.
Holliday, Leonidas Morris	Tucson
Lulley, Alex Gray	Nogales
McCloskey, Pearl Louise	Tucson
McLean, John William	Metcalf
Miller, Leslie Creighton	Tucson
Montijo, Manuel Jr.	Tucson
Murphey, Elizabeth	Tucson
Nutt, Anne	San Diego, Cal.
Ochoa, Sarah Edna	Tucson
Purcell, Ivy May	Tucson
Rose, Frank Winfred	Young
Sine, Eva Jessie	Tucson
Soldini, Amelia Bernice	Tucson
Sparks, Leona May	Tucson
Strong, Leon Henri	Tucson
Tate, Joseph McLane	Bisbee
Thompson, Lillian Virginia	Tucson
Tomlinson, Edward Lorraine	Prescott
Trippell, Alfred Alexander	Tucson
Varney, Erling Alexander	Tucson
Wheeler, Charles A	Tucson
Wheeler, Winifred	Tucson
Wright, W. E.	Tucson

SUB-COLLEGIATE—FIRST—60.

Allen, Laura Chase	Tucson
Attix, Mary Starr	Tucson
Baffert, Peter Edward	Tucson
Batte, Homer Benjamin	Tucson

Beck, Charlotte Ellen	Tucson
Bell, Sylvester D	Tucson
Bennie, Florence Mary	Clifton
Bohannan, Mary Selene	Tucson
Bonn, Frances Clara	Tucson
Brown, Margaret Bernice	Tucson
Brown, Kenneth Brooke	Tucson
Brown, Rollin	Tucson
Browne, Earle George	Tucson
Buehn, Louis Fred	Tucson
Cassiday, Robert Maxwell	Tucson
Castenada, Carlos	Benson
Clayshulte, Julia Cole	Tucson
Clayshulte, Nelson	Tucson
Corda, Mary Wilhelmina	Olive Camp
Cox, William Ernest	Jerome
Culin, John Harding	Tucson
Davis, Charles Martin	Hereford
Decker, Hazel Fern	Tucson
Detloff, John James George	Bisbee
Dial, William Porter	Safford
Donohue, John Bernard	Cananea, Mex
Duffy, Alice E. Elizabeth	Tucson
Duffy, Harriett Loretta	Tucson
Emmons, Guy	Pearce
Estill, Howard Wilmot	Tucson
Firth, Charles Abraham	Aravaipa
Fryer, Joseph Kent	Tucson
Gooddell, Joe	Tucson
Guerry, Marquis LaFayette	Tucson
Heney, Ruth Easter	Tucson
Hepburn, Harold Mettick	Tucson
Huddleston, Julian	Tucson

Jones, Leita	Tucson
Judd, Bessie	Tucson
Kohler, Barbara Hess	Tucson
Long, Robert Kistner	Tucson
Mashbir, Sidney A.	Safford
Mason, Ernest Shanklin	Tucson
McClure, John Clarendon	Tucson
McNeil, Clara May	Tucson
Miller, Edward Burkhalter	Tucson
Nielsen, Hilda Dagmar	Tucson
Nielsen, Gwynne Eleanor	Tucson
Potter, Delbert Dorsey	Clifton
Purcell, Marie Ellen	Tucson
Pusch, Henrietta Louise	Tucson
Rose, Norman Allan	Young
Schneider, Elizabeth Sophia	Tucson
Sine, Janet Volume	Tucson
Skinner, Ida Bella	Tucson
Smith, Felicia Grace	Clifton
Thompson, Lucille	Tucson
Trippel, Amy Irene	Tucson
Wooddell, Florence	Tucson

SUB-COLLEGIATE—UNCLASSIFIED—7.

Ainsworth, Sallie E.—Stenography	Tucson
Clayton, Martha—Stenography, Bookkeeping, Spanish,	Calabasas
Lewis, John William—English,	Tucson
Spires, Leila Martha—History and English	Tucson
Spires, Alice—History and Civics,	Tucson
Spires, Laura—History and English	Tucson
Wright, William Edward—English and Latin,	Tucson

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REGISTER

OF THE

UNIVERSITY OF ARIZONA

FIFTEENTH YEAR

1905-1906

ANNOUNCEMENTS

1906-1907

Tucson, Arizona

1906

REGISTER

OF THE

UNIVERSITY OF ARIZONA

FIFTEENTH YEAR

1905-1906

ANNOUNCEMENTS

1906-1907

TUCSON, ARIZONA
F. E. A. KIMBALL, Printer
1906

CALENDAR.

1906.

Sept.	13,	Thursday	Entrance Examinations.
Sept.	14,	Friday	
Sept.	17,	Monday	Registration Day.
Sept.	18,	Tuesday	First Semester begins.
Nov.	28,	Wednesday	Thanksgiving Recess begins
Dec.	3,	Monday	Instruction resumed
Dec.	22,	Saturday	Holiday Recess begins.

1907.

Jan.	2,	Wednesday	Instruction resumed.
Jan.	31,	Thursday	First Semester ends.
Feb.	1,	Friday	Arbor Day: Anniversary of the University.
Feb.	4,	Monday	Second Semester begins.
June	2,	Sunday	Baccalaureate Discourse.
June	3,	Monday	Exhibition Military Dept.
June	4,	Tuesday	Exhibition Mechanic Arts Department.
June	5,	Wednesday	Commencement.

BOARD OF REGENTS.

Ex-Officio.

HON. JOSEPH H. KIBBEY *Governor of the Territory.*	Phoenix
HON. R. L. LONG *Superintendent of Public Instruction.*	Phoenix

Appointed by the Governor.

WALTER TALBOT, *Chancellor*	Phoenix
GEORGE J. ROSKRUGE, *Secretary*	Tucson
MERRILL P. FREEMAN, *Treasurer*	Tucson
CHARLES H. BAYLESS, A. M.,	Tucson

FACULTY.

KENDRIC CHARLES BABCOCK, Ph. D.
B. L., 1889, Minnesota; A. M., 1895, Harvard; Ph. D., 1896, Harvard.
President; Professor of History. 1903.*

WILLIAM PHIPPS BLAKE, A. M.
Ph. B., 1852, Yale; A. M., Darmouth.
Professor of Geology, Emeritus. 1895.

ROBERT HUMPHREY FORBES, M. S.
B. S., 1892, M. S., 1895, University of Illinois.
Director and Chemist Agricultural Experiment Station. 1894.

FRANK NELSON GUILD, M. S.
B. S., 1894, M. S., 1903, Vermont.
Professor of Chemistry and Mineralogy. 1897.

DAVID HULL HOLMES, B. S.
1892-1894, Washington University; B. S. as of 1901, Arizona.
Professor of Mechanic Arts and Drawing. 1898.

GEORGE EDSON PHILIP SMITH, C. E.
B. S. 1897, C. E., 1899, Vermont.
Professor of Civil Engineering and Physics. 1900.

JOHN JAMES THORNBER, A. M.
B. S., South Dakota [Agricultural]; B. S., 1897, A. M. 1901, Nebraska.
Professor of Biology; Botanist, Agricultural Experiment Station. 1901.

IVAN DeLASHMUTT, B. S.
B. S., 1901, California.
Professor of Metallurgy. 1904.

VINTON A. CLARK, B. S.
B. S., 1898, Vermont.
Professor of Agriculture and Horticulture, Agricultural Experiment Station. [Residence, Phoenix.] 1904.

SAMUEL VICTOR McCLURE
First Lieutenant, U. S. A., 1896, West Point.
Professor of Military Science and Tactics. 1904.

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* Dates following titles indicate appointment to service in the Uni-sity.

EDWIN MORTIMER BLAKE, Ph. D.
Mining Engineer, 1890; Ph. D., 1893, Columbia.
Professor of Mathematics and Mechanics. 1904.

SIDNEY CARLETON NEWSOM, A. M.
A. B., 1895, Harvard; A. M., 1898, Chicago.
Professor of English. 1904.

CYRUS FISHER TOLMAN, Jr., B. S.
B. S., 1896, Chicago.
Professor of Geology. 1905.

ALBERT EARLE VINSON, Ph. D.
B. S., 1901, Ohio [State]; Ph. D., 1905, Goettingen.
Associate Chemist, Agricultural Experiment Station. 1905.

CHARLES ALFRED TURRELL, A. M.
B. S., 1896, Nebraska; A. M., 1901, Missouri.
Assistant Professor of Modern Languages. 1904.

WILLIAM WHEELER HENLEY, A. B.
A. B., 1905, Leland Stanford, Jr.
Assistant Professor of Mechanic Arts. 1905 [Dec.].

MARION CUMMINGS STANLEY, B. L.*
B. L., 1900, California.
Instructor in Latin and Philosophy. 1902.

GLENN A. WILCOX, B. S.
B. S., 1893, Cornell.
Instructor in Science. 1904.

WILLIAM M. RUTHRAUFF, A. M.
A. B., 1902, A. M., 1905, Wittenberg.
Instructor in Economics and History. 1904.

ESTELLE G. LUTRELL, A. B.
A. B., 1896, Chicago.
Instructor in English; Librarian. 1904.

FREDERICK EDWIN TALMAGE, B. S.
B. S., 1903, California.
Instructor in Stenography and Book-keeping. 1904.

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* On leave of absence, February to September, 1906.

LEVONA PAYNE NEWSOM, Ph. D.
A. B., 1892, Ph. D., 1895, Franklin.
Instructor in Latin. 1905.

WILLIAM GEORGE MEDCRAFT, A. M.
A. B., 1898, A. M., 1904, Kansas Wesleyan.
Instructor in Mathematics. 1905.

A. MAY ASHWORTH, A. B.
A. B., 1901, Smith.
Instructor in English. 1905.

PAUL MURRAY, A. B.
A. B., 1905, Butler.
Instructor in Physical Training. 1905.

JOSEPH CONRAD HOLTY, M. S.
B. S., 1903, M. S., 1905, Wisconsin.
Instructor in Chemistry. 1905.

ALICE M. SPITLER, B. S.*
B. S., 1905, Ohio [State]
Instructor in Domestic Science. 1905 [Oct.].

CLARENCE ERROL FERREE, M. S.
B. S., 1900; A. M., 1901; M. S., 1902, Ohio Wesleyan.
Instructor in Philosophy and Science. 1906 [Feb.].

OTHER OFFICERS.

FREDERICK EDWIN TALMAGE, B. S.
Secretary to the President. 1904.

HERBERT BROWN,
Curator Territorial Museum.

MRS. CORNELIA M. STEWART,
Preceptress of Young Women. 1903.

MRS. MARY HENRY AITON, M. D.
M. D. Northwestern.
Medical Examiner for Women. 1905.

ARTHUR W. OLCOTT, M. D.
A. B., 1884, Princeton; M. D., 1887, St. Louis.
Medical Examiner for Men. 1905.

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* Resigned February 1, 1905.

WILLIAM GEORGE MEDCRAFT, A. M.
Head of Men's Dormitory. 1905.

WALTER HAROLD MUELLER
Secretary to the Director of the Agricultural Experiment Station.

ROBERT A. HARRIS,
Superintendent of Buildings and Machinery. 1904.

ROY GIBBONS MEAD,
Commercial Assayer. 1905.

STUDENT ASSISTANTS.

[Service not continuous through the year in every case.]

Rollin H. Holbrook
Burrell A. Hatcher
Walter Mellgren
J. Wesley Gebb
Montrose L. Lee
Fred. Barthels
Raymond A. Newton
Rollin Brown
Charles A. Firth
Ralph N. Harwick
William F. Drew
Joel Elmer Johnson
George E. Kohler
Charles E. Wooddell
Perry Thompson
Lawrence Calloway.
Andrew A. Kuster
Sidney F. Mashbir

Frances M. Babcock
Mabel Wilkerson
Felicia Smith
Lillian Cook
Idora Hadsell

STANDING COMMITTEES.

1905-1906.

The President is ex-officio member of all committees.

Executive.

Professors Forbes, Holmes, E. M. Blake.

Registration and Classification.

Professors Guild, Smith, Newsom, DeLashmutt.

Library.

Professors Guild, Smith, Turrell, Miss Lutrell.

Printing and Publication.

Professors Forbes, Newsom, Mr. Talmage.

Athletics.

Professors Smith, Thornber, Mr. Ruthrauff, Mr. Murray.

Public Exercises.

Professors E. M. Blake, Holmes, Mrs. Stanley.

Intercollegiate Debate.

Professors Thornber, Newsom, Mr. Ruthrauff.

Manual Training.

Professors Holmes, Smith, E. M. Blake.

Co-Operative Association.

Professor Holmes, Mr. Talmage, Ruthrauff.

Sub-Collegiate Department.

Professor Newsom, Mr. Wilcox, Mr. Medcraft, Miss Ashworth.

Rhodes Scholarship.

President Babcock, Professors Newsom, Guild.

UNIVERSITY OF ARIZONA

Established By Act of the Legislative Assembly, 1885; Opened to Students, October, 1891.

PURPOSE AND ORGANIZATION.

The University of Arizona is a part of the system of public education established for the Territory, and aims, as head of such system, to fill the same position as that occupied in the States by the State Universities. In general, the organization of the University is in accordance with the Morrill Act of 1862, creating the Land Grant Colleges. The United States has already set apart fifty-seven sections of valuable public land in the northern timber belt, to which the University will receive full title upon the admission of the Territory into the Union. In creating the University, the Legislative Assembly wisely unified under one management the various schools and institutions of higher learning or investigation, which in some States and Territories have been widely and completely separated—the colleges of liberal culture, the schools of Mines and Engineering, the Agricultural College, and the Agricultural Experiment Station. No professional schools of law, medicine, arts or music have yet been organized. On the other hand, while the high schools of the Territory are in the formative period, the desire to make the University serviceable to all, has led to the establishment and maintenance of a sub-collegiate department.

The purpose of the University of Arizona is, in the language of the organic law, "to provide the inhabitants of this Territory with the means of acquiring a thorough knowledge of the various branches of literature, science and the arts;" and so far as possible a technical education adapted to the development of the peculiar resources of Arizona. In furtherance of this latter purpose, instruction is provided especially in subjects fundamental to agriculture, in the mechanic arts, and in mining and metallurgy. The University, by the nature of its situation, frankly lays its strongest emphasis upon the course in mining engineering. It is, in reality, in a great mining laboratory surrounded as it is on all sides by great mines. Some of these mines developed on a large scale are within a few miles of the city and the number and magnitude of such enterprises is steadily increasing. Probably no University in the United States offers such fine advantages to the students of mining engineering who desire to see the actual operation of great mines, or the development of new enterprises, while carrying on the theoretical and experimental work of the mining course.

The Agricultural Experiment Station, a department of the University, is engaged wholly in investigating and developing the agricultural resources of the Territory.

The government of the University is vested in a corporation styled The Board of Regents of the University of Arizona, consisting of the Governor of the Territory and the Superintendent of Public Instruction, ex-officio, and four other members appointed by the Governor.

LOCATION AND CLIMATE.

The University of Arizona is located at Tucson, a city of twelve thousand inhabitants, on the main line of the Southern Pacific railway, 312 miles west of El Paso, Texas, and 500 miles east of Los Angeles, Cal. The city lies in a broad, flat valley at an elevation of 2,400 feet above sea level and is surrounded by mountains. Its dry, mild, and equable climate has made Tucson a famous winter resort unsurpassed for healthfulness.

The winter climate is especially good; the temperature is cool and strengthening but not severe, the lowest temperature recorded during the average year being about twenty degrees above zero, Fahrenheit. Little rain falls during the winter; fogs are all but unknown; cloudy days are rare. The percentage of sunshine throughout the winter is greater than that recorded at any other place in the United States. Owing to the extreme dryness of the air the highest temperatures known are less oppressive to the senses and less dangerous to the health than the summer heats of the upper Mississippi Valley States. The total amount of rainfall averages less than twelve inches.

The University Campus, consisting of fifty-five acres, is situated upon high ground about a mile from the business center of the city with which it is connected by a street-car line. On every side it commands a view of mountain scenery of remarkable extent and grandeur. The buildings are lighted by electricity furnished by the city plant.

An abundant supply of unusually good water for household, laboratory and irrigation purposes is drawn from a large well on the Campus from a depth of one hundred and twenty feet.

The grounds have been carefully laid out in drives, lawns and gardens. A large number of palm, olive, umbrella, ash, pepper, bagota and cottonwood trees give the Campus quite the air of a well kept park.

BUILDINGS.

The main building, University Hall, is 200 x 150 feet, two stories in height, the first story of gray stone, the second of red brick. It is completely surrounded by a wide two-story veranda. The building contains recitation rooms, laboratories and apparatus rooms of the various departments, an assembly room, and the office and library of the Experiment Station.

The Library and Museum building, costing about $32,000 including furnishings, was occupied in January, 1905. It is a handsome red brick and Bedford sandstone building, with a massive tile roof. The interior finish is in natural oak and pine. The offices of the President and Secretary of the University, three lecture rooms for the departments of geology, mathematics, English and history, work rooms for the library and museum, and a laboratory for the department of geology, are on the first floor. The Library reading room is on the second floor, a large, well-lighted room, beautifully furnished with heavy solid oak reading tables, desks, and wall cases. The stack-room at the rear is fitted up with the most modern steel stacks. The Museum occupies part of the first floor and the west half of the second floor. Large additions in the shape of new oak and plate-glass cases have been made to the furnishings.

North Hall, a dormitory two stories in height built of gray stone of fine quality, is occupied by the young women. Besides the parlor and rooms of the preceptress, it contains sixteen rooms, each large enough to accommodate two students. During the summer of 1905 the building was re-furnished by means of money appropriated by the Legislative Assembly.

South Hall, a large brick building containing forty rooms, besides bath and toilet rooms, is the men's dormitory, capable of accommodating seventy-five students.

The Dining Hall, built of red brick, provides ample boarding accommodation for all persons living on the Campus.

The Shop and Assay building is a large, substantial brick structure. It contains a commodious drawing room for mechanical and free-hand drawing, a large laboratory for forge work, machine practice and carpentry. Two other rooms are used for lockers, and for the motor and engine. The commercial assaying department occupies a number of rooms fully equipped with a large melting furnace, the necessary muffle furnaces, and other accessories for making complete and accurate assays.

The Mill or Mining Machinery building located to the northeast of the main group of buildings, is a plain, wooden structure in which are placed the stamp-mills, jigs, concentrating tables, separators, etc., necessary for the mining laboratory.

Herring Hall, the Gymnasium, is a very substantial high building 40x80 feet, constructed of red brick and white plaster. It was erected in 1903, the gift of Professor James Douglas and his associates of the Copper Queen Consolidated Mining Company, through Colonel William Herring, after whom it was named.

The Pump House and mechanical engineering laboratory replaces the old wooden building which housed the pump and boiler. It was built during the summer of

1905 with funds appropriated by the Legislative Assembly. By the use of brick, cement and iron it is practically fire proof, thus insuring safety to the well and pumps supplying the University with water for all its uses.

Other buildings are the cottage occupied by the department of domestic science, three green houses, a brick barn, and various smaller out-buildings used for shops and store room.

MAINTENANCE.

The University is supported by funds supplied by the United States Government and the Territory of Arizona. By the provisions of the Morrill Act of 1890, the University receives annually from the United States the sum of $25,000 for the College of Agriculture and Mechanic Arts, established in accordance with the Act of July 2, 1862. For the support of the Agricultural Experiment Station the University receives from the same source an annual appropriation of $15,000 by the Act of Congress of 1887, known as the Hatch Act; and $5,000 (for 1906-7, with an annual increase of $2,000) by the Adams Act of 1906. The Territory of Arizona provides the proceeds of a 3-5 mill tax on the assessed valuation of property of the Territory, which in 1905 amounted in round numbers to $27,000. Besides these sums, the University receives from year to year by special grants of the Territorial Legislative Assembly, appropriations for specific purposes. $20,000 was thus voted for the years 1905 and 1906, to be devoted to minor buildings, improvements, repairs, publications, etc.

EQUIPMENT.

LIBRARY.

The library, containing 11,000 bound volumes and 12,000 pamphlets, is open to the use of all students. Of these volumes a collection of complete sets of scientific and literary periodicals, to which additions are being made yearly, is of special service in reference work.

The books are classed by the decimal system and shelved in numeric order with a further author division according to the Cutter numbers. The catalogue is the usual dictionary card catalogue of authors, subjects and titles in one alphabetical arrangement. Library of Congress cards are used whenever obtainable. The Reading Room is supplied with books of general reference which may be consulted by the students without any formality. A representative selection of the popular current periodicals is also placed here together with the weekly Territorial and local daily newspapers.

The Carnegie Library of the city of Tucson is also open to the use of the students of the University. This library is the depository of United States Government documents for the Territory of Arizona.

MUSEUM.

The Seventeenth Legislative Assembly of Arizona passed an act establishing a general museum at the University. The object of the museum is to collect materials of all kinds illustrating the resources and development of Arizona, and particularly to preserve historical relics, including those pertaining to the aboriginal inhabitants. Donations of specimens and collections will be received and acknowledged with thanks, but no special provision has yet been made by the Legislature for the support of this department, aside from a small appropriation for the salary of a curator.

The professors of the University have the immediate care of the collections pertaining to their respective departments. The collections now displayed at the University comprise representative series of minerals, ores and rocks of Arizona. Among these may be particularly mentioned superb specimens from the mines of the Copper Queen at Bisbee. There are also collections of typical rocks and minerals for comparison, and many specimens of ores from different parts of the United States and from abroad. It is desired to make the collection of ores and minerals fully represent the great mineral resources of Arizona.

A large amount has been recently spent upon new cases for the Museum in its new quarters and the material thus re-arranged and displayed in good light becomes doubly attractive and useful.

The museum is indebted to Mr. Herbert Brown, curator, for a large and valuable collection of skins of the birds of Arizona, which he has deposited in the museum, as well as for a collection of ancient aboriginal pottery and other relics. The fossil skull and teeth of an elephant and other fragmentary remains of extinct animals sent from Yuma by Mr. Brown also deserve special mention.

Historical records of much value are gradually accumulating as a part of this museum, and an appeal is made to old settlers and others to bear this fact in mind when making disposition of articles bearing even remote relation to the early pioneers of their history. All records and data of any nature that can be gleaned are worthy of preservation, and it is earnestly desired to have them placed at the University, where they will always be accessable for reference.

BIOLOGY.

The biological laboratories are located on the second floor of University Hall. They are convenient and well-lighted and the equipment is such as is required for modern instruction and research in the biological sciences. The library and apparatus are well selected and adapted to the region and the courses offered.

The collections possessed by this department form a very important part of its equipment. The herbarium consists of 12,000 sheets of mounted plants of which number 2,500 are included in the University botanical survey herbarium. The unique flora and fauna of the mountain, mesa and lowland collecting grounds in close proximity to the institution offer very attractive opportunities for instruction and research especially along ecological lines. The Desert Botanical Laboratory of the Carnegie Institution supplements in most admirable fashion the facilities of the University for investigation.

In addition to the above there are fifty cases of insects, a large case of seeds, articulate and disarticulate human skeletons, plaster and papier-maché models of the important structures of the human anatomy, and duplicate material for study and dissection.

CHEMISTRY.

The chemical laboratories used for instruction are three in number. That used by beginners in the study of general chemistry and qualitative analysis is on the second floor of University Hall and is equipped for the experimental and theoretical study of chemical science.

The laboratory for qualitive analysis is on the first floor of University Hall. It is thoroughly equipped for the teaching of volumetric and gasometric analysis, blow-pipe analysis, metallurgical chemistry, and wet and fire assaying, including apparatus for the electrolytic determination of metals.

The balance room contains analytical and bullion balances of the latest model so arranged as to insure a maximum of stability and accuracy. A lecture and demonstration room fitted with sinks, cabinets, etc., completes an equipment of apparatus and collections adequate for first-class instruction in both theoretical and practical chemistry.

The laboratories of the Agricultural Experiment Station occupy three rooms on the first floor. These are devoted to analytical work and chemical investigations relating to agriculture. Though not intended for the use of students they are of incidental value to the instructors and students through the investigations which are here conducted.

The laboratory for quantitative analysis is used for determinative mineralogy and blow-pipe analysis. The laboratory is supplied with necessary apparatus for student work including glass and wooden models for the study of crystallography, hand and reflecting goniometers for the measurement of the angles of crystals, a polariscope for the study of optical properties of minerals, and a type set of 600 minerals. Three large cabinets of specimen rocks and 500 microscopic sections of rocks have been recently added to the working collections.

PHYSICS.

Three rooms on the first floor of University Hall are set apart for the teaching of physics. The facilities for experimental demonstration of all important phenomena are very complete. The lecture room is fitted with shutters so that it can be darkened. A beam of sunlight directed by a fine clock heliostat outside may be thrown steadily across the lecture table for experiments on light, or used in connection with the solar lantern for a variety of other work. Adjacent to the lecture room are the laboratory and the apparatus room. Both lecture room and laboratory are supplied with water and gas.

An eight-inch Willyoung induction coil with storage and X-ray accessories is used in the study of high-tension electricity. Through the generousity of the Honorable Mark J. Egan, of Clifton, the University added to its equipment for the study of electricity a fine imported set of miniature wireless telegraphy apparatus, capable of transmitting messages about two hundred feet.

This department also has a double dissolving arc-light Ideal stereopticon, which is used by various other departments of the University and for public lectures before the students.

MATHEMATICS.

Models are an important aid to the study of mathematics. The collection of the department includes thread models of about forty ruled surfaces of the third, fourth and sixth orders. These illustrate the theory of surfaces and are also valuable in the study of kinematics and linkages.

The Bulletin and Transactions of the American Mathematical Society, and the Encyklopedia der Mathematischen Wissenschaften are subscribed for by the University Library.

MINING ENGINEERING AND METALLURGY.

The Mill or mining engineering and metallurgical laboratory is equipped for use by the students of metallurgy in connection with their work in testing ores as to their adaptability for treatment by different processes both on a large and small scale. The chief features of the equipment are one Fraser & Chalmers five-stamp mill, with 900 lbs. stamps; one Fraser & Chalmers three-stamp mill, with 250 lbs. stamps; one 7x10 Blake crusher, one pair of Cornish rolls; one new 16ft. Wilfley table of the latest design; three amalgamating pans; and a new thirty-horse power, "type C," Westinghouse motor.

There are also automatic samplers, elevators, trommels, two small cyanide plants, amalgamated plates, percolaters for leaching tests, etc. A complete assay and chemical outfit supplements these so that the student is able to make the necessary determinations on the spot.

The assay laboratory is equipped with assay furnaces for crucible work, for scorifying and cupeling, and for retorting mercury from amalgam, besides all needed appliances for assaying by dry and wet method including electrolysis. The laboratory also has desks and fittings for the chemical work required in the metallurgical and mineralogical investigation and analysis of ores, in mineral fertilizers, and in qualitative tests of minerals.

CIVIL ENGINEERING.

The apparatus in this department has been chosen with a view of giving the student the greatest familiarity with the theory, construction and use of those instruments and machines which observation has shown to be of universal adoption in practical civil engineering work and the allied lines in hydraulic and mining engineering. This apparatus embraces surveyors' and engineers' chains, standard field and pocket tapes; plain solar compasses and transits, mining transits; engineers' levels; stadia, level and transit rods; aneroid barometers; odometers, automatic water-registers, hook-guages; three forms of current meter; stop watch; meteorological instruments; drafting instruments; mechanical calculators, blue-print apparatus; a four and one-fourth inch astronomical telescope with equatorial mountings and accessories; celestial sphere; planimeter; a complete set of apparatus for testing cement; and an Olsen universal testing machine of 100,000 pounds capacity.

MECHANICAL ENGINEERING.

This department has a drafting and recitation room in addition to the regular drawing rooms of the department of Mechanic Arts. In this room is the catalogue file containing the trade literature of about five hundred leading machinery manufacturers of the United States; the collection of working drawings consisting of over three hundred blue prints; and the sample collection ot models, machine parts, valves, electric fittings, insulating materials, abrasives, etc.

The Mechanical and Electrical Laboratory, which occupies a large room in the new Pump House, is equipped for the study and operation of boilers, steam and gasoline engines, hydraulic and electrical machinery. Besides the machinery of the shop and the mill which can be used for experimental purposes and for study of machine design, the University has a 60 H. P. tubular boiler, 35 H. P. Atlas engine, a duplex feed pump, a Cameron pump, a 3 H. P. and a 1-2 H. P. direct current electric motor, an injector, a 500 gallon fire pump and a 40 H. P. Fairbanks-Morse gasoline engine. A 300 gallon two-stage centrifugal pump and its electric motor in the University well serve as part of the equipment for mechanical engineering.

MECHANIC ARTS.

The Mechanic Arts building provided largely through the generosity of the Copper Queen Consolidated Mining Company, has a total floor area of 7,900 square feet divided as follows: Power room and draughting room each 1,200 square feet; wood-working shop, forge shop and machine shop, each 1,400 square feet; wash room, 600; model room 400, and store room 300 square feet.

The entire building is well ventilated and lighted from above as well as from the sides. The drafting room is heated by steam.

The wood shop is equipped with a full assortment of hand tools, six turning lathes, a universal wood-working machine, a Whitney dimension sawing machine, a band saw, a universal trimmer and a large grindstone with truing devise.

The forge room contains twenty-four down-drought forges, twenty-four anvils, a combination shear and punch, a blacksmith's drill press and a full assortment of small tools and appliances.

The machine shop contains one 24-inch Lodge and Shipley engine lathe with taper attachment, two 14-inch

Lodge and Shipley lathes, one 14-inch Pratt and Whitney lathe with taper attachment, one 10-inch Reed speed lathe, one 16-inch Cincinnati shaper, one 24-inch by 6-foot Woodward and Powel planer, one Brown and Sharpe No 2 universal milling machine, one Brown and Sharpe No. 1 universal grinder, one 24-inch Prentice Bros. drill press, one power hack saw, one drill grinder, one emery stand and one grinding attachment for the lathes.

Each shop has its own tool room well arranged and stocked with small tools, guages, measuring instruments etc.

The wash room is supplied with basins, running water and a hundred lockers.

The power room contains a 35 H. P. Atlas engine, a 15 H. P. induction motor, a No. 3 Stewart blower and a 70-inch Stewart exhauster.

AGRICULTURE AND HORTICULTURE.

Because of the situation of the Territorial University the educational work in agriculture and horticulture has taken peculiar form, being largely conducted on the correspondence plan, particularly through the "Timely Hints for Farmers" issued under the auspices of the Experiment Station, but of distinct educational value. Three thousand farmers of the Territory are reached more or less regularly by timely publications on subjects of vital interest. Farmers' Institutes, announcements of which are made from time to time, take the form of short courses in agriculture.

Small and well selected agricultural libraries of slight cost have been forwarded to a considerable number who have expressed a willingness to receive them.

It is believed that this method of dealing with our situation will become increasingly useful.

The equipment for agricultural instruction is good, consisting of an excellent seed collection, a green-house and gardens for experimental purposes containing many rare and interesting plants, and a well-selected agricultural library.

GYMNASIUM.

Herring Hall, the new gymnasium, is fully equipped for the purposes of the department of physical training and athletics. The apparatus is of Standard make, and includes forty chestweights, dumb-bells, bar-bells, wands, Indian clubs, a Medart vaulting horse, parallel-bars, a horizontal bar, a quarter-circle, an abdominal chair, wrestling machine, wrist machine, finger machine, chest expander, chest developer, climbing rope, flying rings, traveling rings, striking bag and drum, jump and vaulting stands, fencing foils and masks, basket balls and goals, five large mats and a set of anthropometric apparatus.

In the basement are located ninty-six lockers and five shower baths which are supplied with hot water from a heater with large reservoir.

In connection with this equipment are the base ball and foot ball field, and four fine tennis courts.

MILITARY.

Room O is used as an armory. It is fitted up with the necessary gun racks and accessories. The equipment includes 150 old style Springfield rifles, 100 Springfield cadet rifles with complete accourtrements, eight sabres and belts, one 3-inch muzzle-loading rifle with carriage and complete equipment, musical instruments for the band, and signal flags. A large clear area south of the Library building is kept leveled and smooth for a drill ground and parade ground. At the rear of the Mill building are the targets for short range practice.

GENERAL ORGANIZATION.

I. College of Agriculture and Mechanic Arts.

In the College are offered courses leading to the following degrees:

1. Bachelor of Philosophy.
2. Bachelor of Science.
    - a. (General scientific course.)
    - b. In Civil Engineering.
    - c. In Mechanical Engineering.

II. The School of Mines.

A four-year course leading to the degrees of Bachelor of Science in Mining and Bachelor of Science in Metallurgy.

A short, two-years' course in mineralogy and assaying.

The Bureau of Mines and commercial assaying.

III. The Agricultural Experiment Station.

IV. The Sub-Collegiate Department of Manual Training.

English, scientific and classical subjects.
Manual training and domestic science.
Bookkeeping, stenography and business practice.

COLLEGE OF AGRICULTURE AND MECHANIC ARTS.

The courses offered in the College of Agriculture and the Mechanic Arts provide both a liberal training along literary and scientific lines and technical training along engineering, mechanical and agricultural lines. Great latitude of election is given in the literary and scientific courses, but the courses in engineering are more rigid in their requirements. Full details of the various courses follow. The aim in all is to combine the practical with the theoretical in instruction. The needs of a young and growing commonwealth are kept in mind, and a steady attempt is made to develop the adaptability and resourcefulness so necessary to meet the changing conditions.

ARIZONA SCHOOL OF MINES.

The School of Mines is designed for the education and training of young men in the arts and sciences directly involved in the industries of mining and metallurgy. Especial attention is given to the sciences of mathematics, physics, chemistry, mineralogy, geology and their applications. The two-years' course in assaying is designed to prepare students as assayers only. The Bureau of Mines and Assaying, while not directly connected with the work of instruction, affords with its laboratory and the influx of new material, a valuable object lesson to the advanced students of mining and metallurgy.

REGISTRATION.

All students are expected to register on registration day at the beginning of the year and at the beginning of the second semester, in the University office or in such rooms as may be designated on that day. Before making choice of elective subjects the student should in every case confer with the instructors concerned and with the committee on registration. A matriculation fee of $5.00 is required of all students upon entering the University. No student will be registered until the matriculation fee has been paid. After this fee is once paid no further fee is required for future registration. After registration no change in classes can be made without the consent of the committee on registration.

Students entering from other institutions should present to the committee certified copies of their records in such schools, together with certificates of graduation or of honorable dismissal. A copy of the the school catalogue or course study should be furnished with the credentials, in order to facilitate the work of the committee.

TUITION.

Tuition is free to students of Arizona. For all non-resident students, tuition is $10 for each semester. No reduction will be made for late registration or early withdrawal.

RECORDS.

The class standing of each student is determined by the instructor in charge. The method of ascertaining the student's record is left to the instructor, and his report in all cases in final.

DISCIPLINE.

The disciplinary policy of the University in all its departments is based upon the assumption that the students are young gentlemen and young ladies, who come to the institution with a high determination to utilize to the full the opportunities offered, and with a keen sense of duty, honor and courtesy to each other and to the faculty. Formal and explicit prohibitions and rules are few, but those will be rigidly enforced, with adequate penalties, and good order and discipline maintained. The University is a civil, rather than a military, community, and such privileges as will not be abused will be allowed all classes of students. In aggravated cases, such as cheating in University work, frequenting saloons, gambling houses, and other objectionable places, and serious breaches of peace or order, the faculty will not hesitate to proceed to the extreme measure of expulsion. In case of expulsion the student is required by regulations of the Regents and faculty to leave the campus immediately, and by Territorial statute to surrender his cadet uniform to the University. In all matters of discipline the faculty and President will strive for fairness, equity and efficacy rather than uniformity.

Students or classes desiring to make requests of the faculty should file their petition in the President's office before the hour of faculty meeting; class petitions must be presented at least two days before the time of meeting.

VACATIONS AND HOLIDAYS.

A short recess (see calendar, page 2) is taken at Christmas time. The long summer vacation begins about June first and continues until the middle of September.

The Thanksgiving recess extends from the close of the regular exercises on the Wednesday before Thanksgiving to the next Monday morning. During the spring of the past two years the cadet companies have made a practice march of from three to five days, which constituted in reality a third vacation. All legal holidays are observed by the cessation of ordinary University work.

Arbor day has been formally adopted by the University Regents as the regular anniversary on which shall be celebrated the founding of the institution, in connection with the ceremonies of tree planting.

LIVING ACCOMMODATIONS.

Provision is made so far as possible for furnishing board and rooms to students of both sexes upon the University grounds. Young men have comfortable quarters in South Hall, the men's dormitory building, which can accommodate about seventy-five students, two in a room. North Hall, the home of the young ladies, is in charge of an experienced and capable preceptress who has constant supervision of those rooming there.

Both dormitories are lighted by electricity. Rooms contain a clothes press, and are provided with single bedsteads, table, chairs, mirror, wash-bowl, pitcher and slop-jar. Students will supply their own mattresses, pillows, sheets, blankets, towels, rugs and brooms, and such other articles as they may desire for ornamenting their rooms. They will care for their own rooms under the direction of the head of the dormitory. The Dining Hall of the University has accommodations for one hundred students. It is under the management of a paid steward who is responsible to the President and the Board of Regents.

While the charge for board is very low, it is the aim of the management to serve substantial, wholesome, appetizing meals. All students having rooms in the dormitory are required to take their meals at the Dining Hall. Students and members of the faculty, who reside outside the dormitories may board at the Dining Hall.

FEES AND EXPENSES.

	Lowest.	Highest.
Tuition, free to students from Arizona...		
Tuition, students non-resident in Arizona, each semester	$10.00	$10.00
Maintenance fee (deposit) by students in Men's Dormitory	3.00	3.00
Maintenance fee (deposit) by male students residing in town	1.00	1.00
Mining excursions for advanced students,	20.00	40.00
Laboratory and shop fees, varying according to courses, per annum	1.00	30.00
Military uniforms	16.25	24.00
Books, per annum	5.00	20.00
Board, per month	17.00	20.00
Lights per room, per month	.50	1.50
Napkins	.50	.50

By resolution of the Board of Regents of the University, board is to be paid in advance on the first of each month. Checks and postoffice or express money orders should be made payable to the President. No reduction in the bill for board will be made for absence for a period of less than one week, except by special arrangement at the office.

Text-books may be obtained directly from the publishers through a book association managed on the co-operative plan under the direction of the faculty. Members of the cadet companies will be required to provide themselves with the prescribed uniform, which will be ordered by the University. The cost of the uniform, which must be deposited in advance, during the present year has been $16.25. This uniform has shown better wearing qualities than a civilian suit of equal cost, and parents are urged to consider the matter of uniform when supplying their sons with clothing for the approaching University year. It may be worn on all occasions, and thus will remove the necessity for additional expenditure for outer clothing other than overcoats. When the warm weather of spring comes, the students are expected to purchase the regulation khaki uniform and campaign hat, the total expense being about $7.

The University has at present no loan funds with which to aid students who must earn their way. Various positions about the grounds, buildings and laboratories of the University, paying from $4 to $20 per month, are filled by students who must be self-supporting. The number, however, is not large, and preference is given to students from Arizona and to those who have spent time enough in the University to demonstrate that they are earnest, capable, reliable young men, likely to do this outside work and at the same time maintain a good record as students.

The Philo Sherman Bennett scholarship was constituted by the gift of $500 to the University in 1905, through the agency of Mrs. William Jennings Bryan, to be used in aiding young women to secure an education.

The income will be awarded to a deserving applicant in the year 1906-7.

RAILROAD RATES.

The Southern Pacific, the Maricopa, Phoenix & Salt River Valley, the Santa Fé, Prescott & Phoenix, the El Paso & Southwestern, and the Gila Valley, Globe & Northern railways have all generously allowed students half rates when journeying to and from their homes, over those parts of these railroads situated in Arizona. In the case of students coming to the University, these half rates may be secured by notifying the President of the University at least two weeks in advance, to enable him to secure the permits from the properauthorities. Tickets are then obtained by the student on application to the railroad ticket agent at his home or to the nearest agent in Arizona, e. g. Nogales or Yuma. Students at the University may secure transportation to their homes and return at vacation time by making application at the office of the President of the University. In case of any misunderstanding with the ticket agent, the student should pay full fare, take the agent's receipt and report the matter to the University authorities. The University can not undertake to secure rebates from the railroad companies in cases where full fare has been paid, unless it can be clearly shown that the railroad company's agents or officers are at fault.

In the case of students coming to the University over the Santa Fé, Prescott & Phoenix road, or over the Maricopa, Phoenix & Salt River Valley road, full-fare one-way tickets to Phoenix in the one case, and to Maricopa in the other, should be purchased and a certificate for the fare thus paid should be secured by the student.

Upon presentation of these certificates endorsed by the University, free return tickets will be issued to the points named.

REQUIREMENTS FOR ADMISSION.

Applicants for admission to any department of the University will be required to furnish satisfactory evidence of good moral character, and a certificate of graduation or of honorable dismissal from the schools with which they were last connected.

For admission to the Freshman class, applicants must be at least sixteen years of age and must satisfy requirements in subjects sufficient to give sixteen credits as described below. A credit is understood to be the equivalent of one study pursued satisfactorily for one year, one period a day, as ordinarily taught in high schools.

Students coming from approved high schools, and presenting a detailed official statement of work completed from the principals of such schools, will be excused by the committee on registration from entrance examinations in those subjects covered by the credentials, with the exception of English composition. Other students will be required to pass the entrance examinations.

For admission to the course leading to the degree of Bachelor of Philosophy the subjects and credits assigned each are:

English	4	Latin	3
Mathematics	2	Greek, French, German or Spanish	2
History and Civics	2		
Science	1	Elective	2

For admission to the course leading to the degree of Bachelor of Science, including the degrees of Bachelor of

Science in Mining Engineering, Civil Engineering, Mechanical Engineering, Metallurgy, or Agriculture, the subjects and credits assigned each, are:

English	4
Mathematics	4
History and Civics	2
French, German or Spanish	2
Science (Physics required)	3
Elective	1

The scope of work required in these various subjects is as follows:

ENGLISH—(a) English classics. An acquaintance with the works named below. These works are divided into two classes, those intended for thorough study and those intended for general reading. The portion of the examination devoted to the former class will be upon subject matter, form, and structure. In addition, the candidate may be required to answer questions involving the essentials of English grammar, and the leading facts in those periods of English literary history to which the prescribed books belong. In the portion of the examination devoted to the latter class, the candidate will be required to present evidence of a general knowledge of the subject matter, and to answer simple questions on the lives of the authors. The form of examination will usually be the writing of a paragraph or two on each of several topics, to be chosen by the candidate from a considerable number—perhaps ten or fifteen—set before him in the examination paper. The treatment of these topics is designed to test the candidate's power of clear and accurate expression, and will call for only a general knowledge of the substance of the books. In preparation for this part of the requirement, it is important that the candidate shall have been instructed in the principles of writing English. A knowledge of grammar is presupposed. (b) English composition. This requirement can be met only by examination of the candidate or by his presenting satisfactory composition books of themes certified by a former teacher as original uncorrected work. The examination will take the form of a theme of five hundred words on some subject familiar to the candidate and will be a practical test of his ability to express himself in writing clearly and consecutively. No candidate will be accepted whose work is notably defective in point of neatness, spelling, punctuation, idiom, or division into paragraphs. Those found lacking in composition will be required to make good the deficiency at once in a special class organized for that purpose.

No student will be admitted without examination, except on the certificate from his former instructors that the entire requirement has been fulfilled. Substantial equivalents, properly certified, will be accepted.

For thorough study: For 1906, 1907, Shakespeare's Macbeth; Milton's L'Allegro, Il Penseroso, Comus, Lycidas; Burke's Speech on Conciliation with America; Macaulay's Essays on Milton and Addison.

For general reading: For 1906, Shakespeare's Merchant of Venice, and Julius Caesar; the Sir Roger de Coverley Papers in "The Spectator;" Goldsmith's Vicar of Wakefield; Coleridge's Rime of the Ancient Mariner; Scott's Ivanhoe; Carlyle's Essay on Burns; Tennyson's The Princess; Lowell's Vision of Sir Launfal; George Eliot's Silas Marner.

MATHEMATICS—Arithmetic as covered in White's Advanced Arithmetic to the appendix, but these subjects will be omitted in the entrance examinations: longitude and time, present worth, stock investments, exchange, equation of payments, compound proportion, partnership and cube root. Algebra, through quadratic equations, as given in Wells' Essentials of Algebra or Wentworth's New School Algebra. Plane geometry as treated in the latest editions of Wentworth or Wells. For students in the scientific or engineering courses, solid geometry and advanced algebra, each requiring a half-year of work, will be required. [Beginning in 1906 advanced algebra will be omitted, and plane and spherical trigonometry will be added.]

GENERAL HISTORY AND CIVICS—As much as is included in Adams' European History and Hinsdale's American Government, or Hart's Actual Government, or text books covering equivalent ground. To meet these requirements a large amount of reference work is expected. In place of General History the following will be accepted: History of Greece and Rome as contained in Myer's histories of Greece and Rome or an equivalent; and Coman and Kendall's or Larned's History of England.

*GREEK—As covered by Gleason and Atherton's Beginners' Greek Book; Xenophon's Anabasis, four books; Homer's Iliad, three books, with composition and the use of Hadley and Allen's, or Goodwin's Greek Grammar.

*LATIN—As covered by Collar's First Latin Book and Viri Romae, together with Allen and Greenough's Grammar and texts; sight reading; Caesar, four books,

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*If any language is offered it must be to the extent of two credits, since a single year's study of a language is not considered of sufficient educational value to be entitled to credits.

or an equivalent; Cicero, four orations; Virgil, six books; sight reading from Nepos, Cicero and Gellius; Daniell's or Bennett's Prose Composition.

*GERMAN—As covered by Spanhoofd's Lehrbuch der deutschen Sprache, and the Syntax (part II) or Thomas' German Grammar, with readings outlined for German 1, 2, 3, 4, or an equivalent.

*SPANISH—As covered by Hills and Ford's Spanish Grammar with readings, etc., outlined for Spanish 1, 2, 3, 4, or an equivalent.

*FRENCH—As covered by Fraser and Squair's French Grammar (Parts I and II), with readings, etc., outlined for French 1, 2, 3, 4, or an equivalent.

SCIENCE—Under this head may be offered the required number of credits in the following subjects: physical geography, physiology, botany, chemistry, physics, or elementary astronomy. At least half the preparation in science should consist of laboratory work. Note-books, covering such laboratory work as has been performed by the student, should be presented for examination.

ELECTIVE—The remaining credits required may be made up from additional subjects ordinarily taught in high schools.

Students from other institutions of equivalent rank may be admitted to classes higher than freshman upon presentation of properly authenticated certificates showing to the satisfaction of the faculty that they are qualified to proceed with their required work. These certificates

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*If any language is offered it must be to the extent of two credits since a single year's study of a language is not considered of sufficient educational value to be entitled to credit.

must be accompanied by statements of honorable dismissal, or leave of absence.

By arrangements with the Arizona Normal School at Tempe, and the Northern Normal School at Flagstaff, students from these institutions may have their records transferred to the books of the University with proper credit, upon presentation of of a certificate duly signed by the principal. Students from this University may also obtain the equivalent privilege at the Normal Schools by presenting the proper certificate of standing, signed by the President.

The faculty desires to establish such relations with high schools and other educational institutions as will enable it to accept their certificates without question. To this end presiding officers are respectfully requested to correspond with the President.

COURSES OF STUDY AND DEGREES.

All facilities and privileges of the University are open to qualified persons of both sexes.

The University offers four-year courses of study leading to the degrees of Bachelor of Philosophy and Bachelor of Science, and to those degrees specialized as shown on page 42-43. In each course the work is partly required and partly elective, as described by schedules later. Each student doing full work is required to take not less than sixteen hours of class room work per week. In laboratory work a period from two to three hours is considered the equivalent of one recitation hour.

Persons of mature age and with sufficient preparation, who are not candidates for degrees, may be admitted to regular classes as special students, provided, however, that in all such cases they show to the satisfaction of the instructors in charge that they can take the course with profit to themselves and without detriment to the regular class.

The faculty reserves the right to omit classes in any course of instruction unless a suitable number of students register for the course.

Students who have completed satisfactorily the required work, and the specified amount of elective work, as shown in the accompanying schedules, will be given the degree of Bachelor of Philosophy or Bachelor of Science. The special character of any course of study may be indicated by adding to the degree the name of the department, as: Bachelor of Science in Mining Engineering, or Bachelor of Science in Metallurgy.

Military science and tactics or, for women, physical culture, is required during the Freshman and Sophomore years. If for any reason a student is excused from these exercises, an additional subject having a minimum of three recitation hours per week will be required.

Credit toward degrees is given by means of a unit system which assigns to each course of instruction offered a certain number of units of credit. A unit ordinarily represents one class-room hour per week, or its equivalent, for one semester. One hundred and twenty-eight units, besides eight units in military science and tactics and physical culture, are required for obtaining a degree in any course.

Any candidate for a degree may present as part fulfillment of requirements for graduation an acceptable thesis embodying the results of a special study of some subject within the range of the course pursued. The subject of the thesis must be submitted for the approval of the faculty at the opening of the Senior year, and the completed thesis must be presented not later than three weeks before commencement day. The credit value will be determined by the faculty at the time the subject is approved.

GROUPS OF COURSES.

General—English, Mathematics.

Group A—Latin, Greek, French, German, Spanish.

Group B—History, Economics, Philosophy, Sociology.

Group C—Botany, Chemistry, Geology, Mineralogy, Physics, Zo-ology.

Group D—Civil Engineering, Mechanics Arts, Mechanical Engineering, Metallurgy, Mining Engineering.

The units necessary for the different degrees are as follows:

1. **Bachelor of Philosophy.**
   - a Required—English, 24, Philosophy, 15, History and Economics, 8.
   - b Group Elective—From Group A, 32; Group C, 16.
   - c Free electives—33.
2. **Bachelor of Science.**
   - a Required—English, 8; Mathematics, 16.
   - b Group Electives—From Group B, 4; Group C and D, 56.
   - c Free electives—44.

3. For the degrees of Bachelor of Science in Mining Engineering, Metallurgy, Civil Engineering, and Mechanical Engineering, the same work is required in all for the first two years, with differentiation during the third and fourth years.

Mining Engineering, Metallurgy, Civil Engineering, Mechanical Engineering

First year.			Second year.		
English, 1, 2	6	units.	Mathematics, 3, 4	6	units
Mathematics, 1, 2	10	"	Physics, 1, 2	8	"
Chemistry, 1, 2	8	"	Chemistry, 3, 4	8	"
Mech. Arts, 1, 2	8	"	Mech. Arts, 3, 4	4	"
	32	"	Civil Engin., 1, 2	8	"
				34	

Mining Engineering

Third year.			Fourth year.		
Mathematics, 5, 6	9	units.	Mining Engin. 1, 2	8	units
Mineralogy, 1, 2	7	"	Geology, 3, 4	6	"
Geology, 1, 2	8	"	Metallurgy (lect.)	3	"
Civil Engin., 5, 6	8	"	Civil Engin., 10	4	"
	32	"	Mineralogy, 3, 4	4	"
			Mech. Engin., 1, 2	6	"
				31	

Metallurgy

Third Year.		Fourth Year.	
Mathematics, 5, 6	9 units	Metallurgy, 1, 3, 4, 5, 6	13 units
Mineralogy, 1, 2	7 "	Mining Engin., 1	4 "
Geology, 1, 2	8 "	Civil Engin., 5, 10	8 "
Chemistry, 5, 6	8 "	Mech. Engin., 1, 2	6 "
	32		31

Civil Engineering

Third year.		Fourth year.	
Mathematics, 5, 6	9 units.	Civil Engin., 7, 8	8 units
Civil Engin., 5, 6	8 "	" " 10	4 "
" " 4	1 "	Mech. Engin., 1, 2	6 "
" " 9	4 "	Mining Engin., 1	4 "
" " 12	2 "	Elective	8 "
Geology, 1, 2	8 "		31
	32		

Mechanical Engineering

Third year.		Fourth year.	
Mathematics, 5, 6	9 units.	Mech. Engin. 5, 6	8 units
Civil Engin., 5, 6	8 "	" " 7, 8	8 "
Mech. Engin., 1, 2	6 "	Civil Engin., 10	4 "
Mech. Engin., 3, 4	4 "	Mining Engin., 1	4 "
Mech. Arts, 7, 8	4 "	Elective,	7 "
	31		31

COURSES OF INSTRUCTION.

Courses having odd numbers are given in the first semester; those having even numbers, in the second semester. The hours mentioned show the number of periods per week. The subjects are arranged alphabetically.

BIOLOGY.

PROFESSOR THORNBER, MISS TILLMAN.*

The courses which follow are calculated to articulate with the work done in biology in the average western high school.

The Desert Botanical Laboratory of the Carnegie Institution of Washington, D.C., has been located in the mountains adjoining Tucson. In this laboratory, the southwest with its unique and as yet little investigated flora, gains what is destined to be one of the important centers of active, scientific research. The research facilities of the laboratory are all that could be desired, and the investigations upon the desert flora will appeal to students of botany from all quarters. In the light of the above, the importance of the Desert Botanical Laboratory to the University of Arizona and especially to the department will be apparent.

BOTANY 1, 2. GENERAL BOTANY—Botany 1, treats of the general principles of the histology and physiology of plants. Botany 2 completes the year's work with a general survey of plant types from Protophyta to Spermatophyta. Guide, Bessey's Essentials of Botany supplemented with lectures. Laboratory studies will form the basis of all the work. Open to all students. 4 hrs., or an equivalent, both semesters. 8 units.

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* Beginning September 1906.

BOTANY 3, 4. ADVANCED BOTANY—The second year's work is not definitely outlined, but it is purposely left open to be formulated as the needs of the students applying appear to demand. Courses in general morphology of the fungi, histology, physiology, and the taxonomy and ecology of the native flora are offered here. Opportunities are offered for research work. Open to all students who have taken Botany 1, 2. 4 hrs., or an equivalent, both semesters. 8 units.

ZO-OLOGY 1, 2.—Conducted along lines corresponding very closely to those followed in Botany 1, 2. Laboratory studies as in that course are made the main feature of the work. In the study of the Mammalia constant reference is made to human anatomy, so that this portion is in part a review of the course in anatomy and physiology offered in the sub-collegiate department. Text-book, Parker and Hazwell's "Manual of Zo-ology." Open to all students. 4 hours, or an equivalent, both semesters. 8 units.

CHEMISTRY.

PROFESSOR GUILD, MR. HOLTY.

The instruction in chemistry has two main objects in view: first, to promote general culture; and secondly, to introduce students to technical work, especially in mining. The first two years' work in general chemistry, qualitative and quantitative analysis, places the student in a position to take up advantageously the study of mining, agricultural chemistry or metallurgy.

CHEMISTRY 1. GENERAL CHEMISTRY—Lectures illustrating the chemical properties of the elements and their compounds, supplemented by recitations and laboratory practice. Text-books, Newths' Inorganic Chemistry. Open to all students. 4 hrs., first semester. 4 units.

CHEMISTRY 2. QUALITATIVE ANALYSIS—Practical work in the laboratory, including the analysis of alloys, commercial products, minerals and like substances. The course is accompanied by lectures and recitations. Text-book, Eliot and Storer's Qualitative Analysis, and various reference books. Open to students who have taken chemistry 1. 4 hrs., or an equivalent, second semester, 4 units.

CHEMISTRY 3. QUANTITATIVE ANALYSIS—Laboratory practice with lectures and recitations; the work will be chiefly in gravimetric methods of analysis. Open to students who have taken Chemistry 2. 4 hrs., or an equivalent, first semester. 4 units.

CHEMISTRY 4. VOLUMETRIC ANALYSIS—A continuation of the work in Chemistry 3, special attention being given to the methods of assaying employed in the West. 4 hrs., or an equivalent, second semester. 2 units, if discontinued March 15th, otherwise 4 units.

CHEMISTRY 5, 6. SPECIAL QUANTITATIVE ANALYSIS —The analysis of water, gases, oils, minerals. Open to students who have taken Chemistry 4. 4 hrs., or an equivalent, both semesters. 8 units.

*CHEMISTRY 7, 8. ORGANIC CHEMISTRY—Lectures on the carbon compounds; laboratory work in organic analysis and the preparation of organic compounds; vapor density and molecular weight determination. Open to students who have taken Chemistry 3, 4. 4 hrs., or an equivalent, both semester. 8 units.

*CHEMISTRY 9. SYNTHETIC CHEMISTRY—The preparation of pure chemical compounds from the crude mineral products. Open to students who have taken Chemistry 4. 2 hrs., or an equivalent, first semester. 2 units.

*CHEMISTRY 10. PHYSICAL CHEMISTRY—Lectures: Historical introduction leading up to a discussion of modern chemical theories. Open to students who have taken Chemistry 3. 2 hrs., second semester. 2 units.

*CHEMISTRY 11, 12. CHEMISTRY OF THE RARE ELEMENTS—The analysis and synthesis of uranium, molybdenum, tungsten, vanadium and cerium compounds. Open to students who have taken Chemistry 6 and 9. 4 hrs., or an equivalent, both semesters. 8 units.

CIVIL ENGINEERING.

PROFESSOR SMITH.

The courses in this department have been arranged with special reference to the engineering development of the Southwest. Especial stress will be laid on surveying, railroad and bridge work, and irrigation engineering. The design throughout the courses is to give the student a thorough and practical knowledge of the essential

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* Not given in 1905-6.

principles of his profession, and to teach the technical practice of the times so far as possible without sacrificing in other directions. Engineering practice changes from year to year and a graduate who is thoroughly grounded in the principles of his profession will readily acquire the technical side.

CIVIL ENGINEERING 1, 2. SURVEYING—Use and care of instruments, including plane and solar compasses, levels, transits; plane land surveying; United States system of land surveys; city, topographical, and mine surveying; earthwork computations; determination of azimuth, latitude, longitude and time by observations on the circumpolar stars and on the sun. One full half-day each week is devoted to field practice; plots are made of field surveys and a topographic map of some area in the vicinity of Tucson is executed by each student. Lectures, recitations, drawing and fieldwork. Textbook, Raymond's "Surveying." Open to students who have taken trigonometry. 3 hrs., both semesters and Saturday forenoons. 8 units.

*CIVIL ENGINEERING 4. GEODESY—Size and shape of the earth; latitude, longitude and azimuth formulas; baseline apparatus; trigonometric leveling. Lectures and fieldwork. 1 hr., second semester. 1 unit.

CIVIL ENGINEERING 5. MATERIALS OF CONSTRUCTION—Their properties, preparation and use; stone, brick, lime, cement, concrete, timber, iron and steel. Lectures, recitations and laboratory work. 4 hrs., first semester. 4 units.

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* Not given 1905-6.

CIVIL ENGINEERING 6. MASONRY CONSTRUCTION—Foundations on land and in water, cofferdams, cribs, caissons, round and sheet piling, bridge piers and abuttments, retaining walls, dams, arches, the theory and practice in reinforced concrete construction. Graphical methods of determining stability. 4 hrs., second semester. 4 units.

*CIVIL ENGINEERING 7, 8. MODERN FRAMED STRUCTURES—Stresses in the various types of bridges under different systems of loading; graphical investigation of stability of arches and retaining walls; complete design with drawings for a plate girder bridge, and a steel frame building. Text-book, Merriman & Jacoby's "Roofs and Bridges." 4 hrs., both semesters. 8 units.

CIVIL ENGINEERING 9. RAILROAD ENGINEERING—Preliminary and location surveys; simple and easement curves, turnouts and switches; principles of economic location as based upon cost of construction, operating expenses, alignment and grades; maintenance-of-way. The fieldwork consists of the surveys for a railroad of sufficient length to secure familiarity with the methods of actual practice. Each student makes a complete set of notes, maps, profiles, calculations and estimates of cost. Open to students who have taken Engineering 1, 2. 4 hrs., until December, one hour and Saturdays through December and January. 4 units.

CIVIL ENGINEERING 10. HYDRAULICS—Velocity and discharge from orifices, weirs, tubes, and pipes; flow in sewers, ditches, canals, and rivers; measurement of

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* Not given in 1905-6.

water power; water wheels of various types. Text-book Merriman's "Hydraulics," 4 hrs., first semester. 4 units.

*CIVIL ENGINEERING 11. PRINCIPLES OF IRRIGATION—A study of the present condition of irrigation development in the United States; irrigation legislation; methods of establishing rights to water; a brief reference to the engineering principles relating to the construction and maintenance of canals and reservoirs and the various means of diverting and measuring water for use in irrigation. Prerequisite, Engineering 2. 2 hrs., second semester. 2 units.

ECONOMICS.

MR. RUTHRAUFF.

ECONOMICS 1, 2. A study of the general principles and laws of economics based upon Seager's "Introduction to Economics." Special attention is given to the study and criticism of socialism, and the problem of municipal and government ownership of natural monopolies and public utilities. 2 hrs., both semesters. 4 units.

*ECONOMICS 3, 4. A general study of the history and theory of Economics based upon Marshall's "Principles of Economics," with lectures and required reading. This course aims to acquaint the students with the different modern theories, and economic plans for reform. 3 hrs., both semesters. 6 units.

ENGLISH.

PROFESSOR NEWSOM

The purpose of the courses outlined below is to give a general knowledge of English literature from the six-

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* Omitted 1906-7.

teenth century to the present time. Chief stress is placed upon the study of a few authors of the most important periods, though the history of our literature is also traced from age to age. The course in composition aims to develop accurate thought and clear, vigorous expression.

ENGLISH 1 and 2. COMPOSITION—Prescribed for all Freshmen. *First Semester:* Short weekly themes corrected and rewritten. Selected readings from English and American writers of prose, with written and oral reports.

Second Semester: Fortnightly themes illustrating methods in narration, description, exposition, and argumentation. Hill's "Beginnings of Rhetoric and Composition" supplemented by lectures. Selected readings and reports thereon as in the first semester. 3 hrs., both semesters, 6 units.

ENGLISH 3 and 4. NINETEENTH CENTURY PROSE—From the publication of the Lyrical Ballads to the death of Ruskin 1798-1899. Prescribed readings, lectures, discussions, written reports. Primarily for Freshman in the Ph. B. course. 2 hrs., both semesters. 4 units.

ENGLISH 5 and 6. ELIZABETHAN LITERATURE—Shakespeare, selected plays; other Elizabethan dramatists, especially Johnson and Marlowe; Spenser's Faerie Queene and shorter poems. Lectures and discussions. 3 hrs., both semesters. 6 units.

*ENGLISH 7,8. EIGHTEENTH CENTURY LITERATURE—From the death of Dryden to the publication of the Lyrical Ballads, 1700-1798; special attention given to the period of Queen Anne and the early romantic revival. Lectures and discussions. 2 hrs., both semesters. 4 units.

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* Omitted 1906-7.

* ENGLISH 9, 10. SEVENTEENTH CENTURY LITERATURE—From the closing of the theaters to the death of Dryden, 1642-1700. 2 hrs., both semesters. 4 units.

ENGLISH 11, 12. NINETEENTH CENTURY POETRY—From the publication of the Lyrical Ballads to the death of Tennyson, 1798-1892. Lectures and discussions; Macmillan's Globe editions. 2 hrs., both semesters. 4 units.

FRENCH.

ASSISTANT PROFESSOR TURRELL.

FRENCH 1, 2. First Semester: Fraser and Squair's French Grammar (Part I), Aldrich and Foster's French Reader. Second Semester: Reading of Dumas' "La Belle Nivernaise," Labiche and Martin's "La Poudre aux Yeux," Halevy's "L'Abbe Constantin." Composition and dictation, with drill on the irregular verbs. 5 hrs., both semesters. 8 units.

FRENCH 3, 4. First Semester: Fraser and Squair's French Grammar (Part II). Merimee's "Colomba," Lamartine's "Graziella" or "Jeanne d'Arc," Feuillet's "Le Roman d'un jeune homme pauvre." Second Semester: Selected Readings, as DeVigny's "Cinq Mars," French Lyrics (Canfield), Victor Hugo's "Les Miserables" (Super), etc. 5 hrs., both semesters. 8 units.

FRENCH 5. THE CLASSICAL FRENCH DRAMATISTS. Reading of plays of Corneille, Racine and Moliere. Study of the History of French Literature to the 19th century. 3 hrs., first semester. 3 units.

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* Omitted 1906-7.

FRENCH 6. HISTORY OF FRENCH LITERATURE IN 19TH CENTURY. Class reading of recent writers as Daudet, Dumas, Zola, Verlaine, Coppée, Rostand, etc. 3 hrs., second semester. 3 units.

[Courses 5, 6 were not given in 1905-6, but will be offered in 1906-7.]

GEOLOGY.

PROFESSOR TOLMAN.

The courses in Geology are constructed with special reference to the following: 1st, the development of the observational faculties; 2nd, training in inductive and deductive reasoning whereby each student discovers for himself the causes for each phenomenon observed; 3rd, practical application of geological principles to mining with special training in structural geology and mapping.

GEOLOGY 1, 2. GENERAL GEOLOGY—Geological processes, their causes and effects. The atmosphere, surface and underground water, the ocean and the ice and snow as geological agents. Earth movements; mountain and continent building, Vulcanism. Rocks, their origin and alterations. Structural geology (problems through the entire course). Short review of the physical history of the earth and correlated life progress. Detailed study of ore deposits.

Geological excursions once a month. Laboratory work is given in connection with the study of rocks, structural geology and ore deposits. Open to students who have taken or are taking minerology 1, 2. 4 hrs., a week both semesters. 8 units.

GEOLOGY 3, 4 TOPOGRAPHICAL AND FIELD GEOLOGY—Constructions of maps and sections. United

States Geological Survey methods of geological mappings. Two geological maps are required of each student. One of a portion of the Tucson mountains (composed of lava flows) and one of a district in the Rincon mountains. (faulted and folded sedimentary rocks). Prerequisite Geology 1, 2. All day Saturdays, both semesters. 6 units.

GERMAN.

ASSISTANT PROFESSOR TURRELL.

GERMAN 1, 2. First Semester: Spanhoofd's "Lehrbuch der deutschen Sprache," complete. Second Semester: Reading of easy texts, such as Andersen's "Bilderbuch ohne Bilder," Storm's "Immensee," von Hillern's "Hoeher als die Kirche," Gerstaecker's "Germelhausen." Composition, dictation and continued grammar drill. 5 hrs., both semesters. 8 units.

GERMAN 3, 4. First Semester: Thomas' German Grammar (Part II). Reading of Freytag's "Die Journalisten," Heine's poems and "Die Reisebilder," Lessing's "Minna von Barnhelm." Second Semester: Goethe's "Hermann und Dorothea," "Egmont," Schiller's "Wilhelm Tell," "Maria Stuart." An outline of the history of German literature will be given during the year using Bernhardt's "Deutsche Litteraturgeschichte," with library readings. 5 hrs., both semesters. 8 units.

*GERMAN 5. GERMAN LITERATURE IN THE NINETEENTH CENTURY. Lectures on the Romanticists and their successors. Class reading of Kleist, Grillparzer, etc. 3 hrs., first semester. 3 units.

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*Omitted 1906-7.

*GERMAN 6. RECENT LITERARY MOVEMENTS IN GERMANY. The rise of naturalism and symbolism. Comparison with the Storm and Stress movement of the eighteenth century. Study of Wildenbruch, Fulda, Sudermann, Hauptmann. 3 hrs., second semester. 3 units.

HISTORY.

PRESIDENT BABCOCK, MR. RUTHRAUFF.

In the work in history emphasis is placed on the social and political development, the relation of cause and effect, and the unity of history. The laboratory method is used wherever possible and individual work insisted upon.

HISTORY 1, 2. ENGLISH HISTORY—Gardiner's Student's History of England is used as the basis for the work, with much assigned reading and the preparation of reports. Open to all students. 4 hrs., both semesters. 8 units. Mr. Ruthrauff.

* HISTORY 3, 4. AMERICAN COLONIAL HISTORY—A detailed study of the American colonies under Great Britain, and of the United States to the adoption of the Constitution. Lectures, assigned reading, and reports. Open to students who have taken History 1, 2. 3 hrs., both semesters. 6 units.

HISTORY 5, 6. CONSTITUTIONAL HISTORY OF THE UNITED STATES—A detailed study of the formation of the Union and of the political and constitutional history of the United States down to 1885, based on letters and speeches of American statesmen, public documents,

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*Omitted 1906-7.

special histories. Open to students who have taken History 1, 2. 3 hrs., both semesters. 4 units. President Babcock.

LATIN.

MRS. STANLEY, MRS. NEWSOM.

The courses below are open to students who have completed the first two years of Latin in the sub-collegiate department, or an equivalent. Constant, thorough drills are given in technical grammar and prose composition. In reading, the matter is subjected to grammatical, metrical, rhetorical and historical explanation. The study of the text is made the means of mental discipline, of developing the faculties of observation and critical judgment, and of acquiring habits of thoroughness and accuracy.

LATIN 1, 2. CICERO AND OVID—Six Orations of Cicero. Selected Letters. Gleason's Term of Ovid. Exercises in prose composition. 4 hrs., both semesters. 8 units.

LATIN 3, 4. VIRGIL—Six Books. LIVY—Book I, Cicero's De Senectute. Open to students who have taken Latin 1, 2. 4 hrs., both semesters. 8 units.

MATHEMATICS.

PROFESSOR E. M. BLAKE, ASSISTANT PROFESSOR MEDCRAFT.*

MATHEMATICS 1. COLLEGE ALGEBRA—Four hours per week. GRAPHICAL METHODS. One two-hour laboratory period per week. First semester. 5 units. Assistant Professor Medcraft.

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* Beginning September, 1906.

MATHEMATICS 2. PLANE AND SPHERICAL TRIGONOMETRY—Four hours per week. GRAPHICAL METHODS. One two-hour period per week. Second semester. 5 units. Assistant Professor Medcraft.*

Mathematics 1 and 2 are prescribed for first year students in Mining Engineering, Metallurgy Civil and Mechanical Engineering. The work in graphical methods is supplementary to algebra and trigonometry and introductory to analytical geometry.

MATHEMATICS 3. ANALYTICAL GEOMETRY.—Prerequisite Mathematics 1, 2. 3 hrs.; first semester. 3 units. Prof. Blake.

MATHEMATICS 4. DIFFERENTIAL CALCULCUS—Prerequisite, Mathematics 3. 3 hrs., second semester. 3 units. Prof. Blake.

Mathematics 3 and 4 are prescribed for second year students in Mining Engineering, Metallurgy, Civil and Mechanical Engineering.

MATHEMATICS 5. INTEGRAL CALCULCUS—Prerequisite, Mathematics 4. 4 hrs., including one laboratory period, first semester. 4 units. Prof. Blake.

MATHEMATICS 6. ANALYTICAL MECHANICS—Prerequisites, Mathematics 5, and Physics 1, 2. 5 hrs., including one laboratory period, second semester. 5 units. Prof. Blake.

Mathematics 5, 6 are prescribed for third year students in Mining, Civil, and Mechanical Engineering.

NOTE.—Beginning September, 1907, trigonometry will be a preparatory subject and analytical geometry a freshman subject; calculcus will be given during the whole sophomore year; and analytical mechanics will occupy the whole junior year.

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* Beginning September, 1906.

MECHANIC ARTS.

PROFESSOR HOLMES, ASSISTANT PROFESSOR HENLEY.

The mechanic arts courses comprise the elements of drawing and shop work. The work consists of lectures, recitations, drawing, tool and machine work. The courses are designed with special regard for the needs of the students in engineering. It will be noted that the courses outlined below vary considerably in their arrangement from those heretofore announced.

(COURSES FOR 1906-7)

MECHANIC ARTS 1. MECHANICAL DRAFTING—Lettering, tracing and blue printing, 3 two-hour periods a week, first semester. 2 units. Prof. Holmes.

MECHANIC ARTS 2. DESCRIPTIVE GEOMETRY—Church's seventeen problems on lines and planes. 3 two-hour periods a week, second semester. 2 units. Prof. Holmes.

MECHANIC ARTS 3. WOOD SHOP—Joinery, bench and lathe work, elements of pattern making. 2 three-hour periods a week, first semester. 2 units. Prof. Henley.

MECHANIC ARTS 4. FORGE SHOP—Forge work in iron and steel, tempering, case hardening and annealing. 2 three-hour periods a week, second semester. 2 units. Prof. Henley.

MECHANIC ARTS 5, 6. MACHINE SHOP—Bench and floor work, drill press, lathe, planer, milling machine, grinder, etc. 2 three-hour periods, both semesters. 4 units. Prof. Henley.

MECHANIC ARTS. 7, 8. ADVANCED SHOP WORK—Manufacturing methods, erection of machinery. Open to students who have had Mechanic Arts 1, 3, 4, 5, and 6. Two periods, both semesters. 2 units. Prof. Henley.

MECHANIC ARTS 9, 10. ADVANCED DESCRIPTIVE GEOMETRY—This course is a continuation of Mechanic Arts 1, 2. Church's "Descriptive Geometry" is the text book used. The work covers shade, shadow and perspective. Open to all students who have taken Mechanic Arts 1, 2. 2 periods or an equivalent, both semesters. 4 units. Prof. Holmes.

MECHANICAL ENGINEERING.

PROF. E. M. BLAKE, MR. LIGDA.

MECHANICAL ENGINEERING. 1. HEAT ENGINES—Principles of thermodynamics as applied to steam and internal combustion engines, and compressed air machinery. Study of the general structural features and methods of operating the more important types of boilers, steam and gasoline engines. 2 hours and one weekly laboratory period, first semester. 3 units.

MECHANICAL ENGINEERING. 2. DYNAMO ELECTRIC MACHINERY—Theory underlying the generation transmission, and utilization of electric currents. Descriptions of the more important types of generators and motors. 2 hours and one weekly laboratory period, second semester. 3 units.

MECHANICAL ENGINEERING. 3, 4. KINEMATICS OF MACHINERY, AND ELEMENTARY MACHINE DESIGN. Theory and design of linkages, gears, cams, screws, etc. Two drafting room periods of two hours each per week, both semesters. 4 units.

MECHANICAL ENGINEERING. 5. MACHINE DESIGN. Continuation of Mechanical Engineering 3, 4. Exercises in design particularly directed towards the designing of complete machines. Three drafting room periods of three hours each per week, first semester. 4 units.

MECHANICAL ENGINEERING, 6. MECHANICAL ENGINEERING—Study of power plants and other machinery installations as to arrangement of parts, adaptability to intended work, economy of first cost and operation. Exercise in design of power plants and writing of specifications. One lecture and two drafting room periods of three hours each per week, second semester. 4 units.

METALLURGY.

PROFESSOR DE LASHMUTT.

METALLURGY 1. INTRODUCTION TO METALLURGY —Physical properties of metals, alloys, thermal treatment of metals, thermal measurements, fuel, refractory materials, metallurgical processes, furnaces, thermo-chemistry, metallurgy of iron and steel. Seniors in Mining Engineering and Metallurgy. Lectures and recitations, 4 hrs., for 1 month, first semester. 1 unit.

METALLURGY 2. FIRE ASSAYING—Fire assay for gold, silver and lead. Bullion assays. 15 hrs. per week, or an equivalent during March, April and May. Prerequisite Chemistry 3 and 4. 2 units.

METALLURGY 3. METALLURGY OF GOLD AND SILVER—Stamp milling, chlorination, cyanidation, pan-amalgation; Patio, Cazo, Fondon, Kröhnke and Tina processes, hyposulphite leaching practice, etc. Lectures and recitations. Prerequisites, Metallurgy 1 and 2. 4 hrs., first semester. To be given after completion of metallurgy 1. 3 units.

METALLURGY 4. METALLURGY OF LEAD AND COPPER—Sampling, receiving, purchasing, roasting; blast furnace methods, reverberatory furnace methods, pyritic smelting, converting, desilverization of base bullion, electrolytic refining, hydro-metallurgy of copper, etc. Lectures and recitations. Prerequisites, Metallurgy 1, 2 and 3. 4 hrs., second semester. 4 units.

METALLURGY 5 and 6. METALLURGICAL LABORATORY—Concentration, amalgamation, cyanidation, chlorination, hyposulphite lixiviation, etc., tests together with mill work. 2 hrs., or an equivalent, both semesters. Primarily for seniors in the course in Metallurgy 4 units.

METALLURGY 7. ORE DRESSING—Breaking, crushing, separating, concentrating, sampling; mill processes and management. Lectures and recitations. Prerequisites Chemistry 3 and 4 and Metallurgy 2. 3 hrs., first semester. 3 units.

METALLURGY 8. Metallurgy of zinc, cadmium, nickle, mercury, bismuth, tin, antimony, cobalt, platinum, tungsten, molybdenum. Lectures and recitations. Prerequisites. Metallurgy 1, 2 and 3. 2 hrs., second semester. 2 units.

MILITARY SCIENCE AND TACTICS.

LIEUTENANT MC CLURE.

PRACTICAL COURSE—Infantry Drill Regulations, through the school of the batallion in close and extended order. Advance and rear guards, and outposts. Marches. The ceremonies of batallion review, inspection, parades, guard mounting, and escort of colors. Infantry target practice. Instruction in first aid to the injured. Required of all able-bodied male students throughout the Freshman and Sophomore years except that students who have satisfactorily completed four years of drill at the end of Freshman year may be excused from further work in the department. Elective during the remainder of the course. Juniors who elect this course may receive credit to the extent of two units. Three hours both semesters.

THEORETICAL COURSE—The Infantry Drill Regulations covered by the practical instruction. The Manual of Guard Duty. Small-Arms Firing Regulations, Parts I, II and VII. The Articles of War. One lecture on camps and camp hygiene. Lectures on other military subjects. Required of all commissioned and non-commissioned officers. One hour, both semesters.

Students claiming exemption from drill will be required to secure a certificate of disability from a physician designated by the faculty, unless the disability is apparent. Those so excused will be required to elect a subject in place of this course. The officers will be appointed from an eligible list determined by examination, both scholarship and class standing being taken into account, according to the principles governing such selection at the United States Military Academy.

Each member of the military organization will be required to provide himself with the regulation uniform upon his entrance. A deposit covering the cost of the uniform should be made upon registration. The uniform consists of cap, coat and trousers of cadet gray cloth trimmed with black braid, and closely resembles the undress uniform of the United States Military Academy at West Point.

MINERALOGY.

PROFESSOR GUILD.

The main object of the course in mineralogy is to familiarize the students with facts and methods that will enable him to determine the character of an ore or mineral by an observation of its physical properties and by the performance of a few simple tests with the blowpipe. The value of such a course cannot be over estimated, since these quick methods of analysis are frequently needed in the field and mine when recourse cannot be had to a well-eqipped chemical laboratory. The course is of value also to the student of general science, since it adds to the pleasure of a day in the mountains or field, and is necessary to full appreciation of the study of geology. The course is not only practical, but the theoretical side of the subject receives attention in mineral optics, crystallography and similar topics.

MINERALOGY I, 2. Lectures and recitations in crystallography and the classification and uses of minerals; laboratory work in blow-pipe analysis and determinative mineralogy; work with the reflecting goniometer in measuring the angles of crystals, and with the polariscope in studying the optical properties of minerals; the study of a type collection of 600 minerals arranged and classified according to Dana. Text-books: Dana's "Text book of Mineralogy," and Brush's "Manual of Determinative Mineralogy and Blow-Pipe Analysis." Open to students who have taken Chemistry 2. 4 or 5 hrs., both semesters. 7 or 8 units.

MINERALOGY 3. Advanced crystallography and microscopic study of the rock-forming minerals. Open to students who have taken a course in elementary Geology, Mineralogy 2, and Physics 2. 3 hrs., or an equivalent, first semester. 2 units.

MINERALOGY 4. PETROLOGY—The preparation of thin sections of rocks for microscopic study, rock analysis, and the study of a type selection of rocks. Text-book, Harper's "Petrology for Students." Open to students who have taken Mineralogy 3. 3 hrs., or an equivalent, second semester. 2 units.

MINING ENGINEERING.

PROF. TOLMAN.

In this course attention is largely directed to the economics of mining and the laboratory work is so arranged that upon the completion of the course the student will have in his notes plans which will be of value in the practice of the profession.

MINING ENGINEERING. 1, 2. Ores, their nature and occurrence, location of claims, mining laws of the important mining countries of the world; prospecting, excavations; tunnels, shafts, timbering, underhand, overhand, square sett, filling and caving methods of mining, pumping, ventilation, transportation, hoisting, installation of machinery and surface improvements.

Methods for undeveloped properties compared with those for developed mines. Mine accounts, cost sheets, slope sheets, assay plans, methods of management, mine sampling and mine reporting. Prerequisites Mathematics 5, 6, Geology 1, 2. 2 hours and two laboratory periods of three hours each, both semesters. 8 units.

MINING ENGINEERING 3. PRACTICAL MINING—Before entering upon the work of the Senior year, all students who are candidates for the degree of B. S. in mining, must have spent at least four weeks in practical underground mining. The fulfillment of this requirement must be evidenced by the certificate of the mine superintendent or foreman, and by notes and sketches of the processes observed, to be presented to the faculty of the School of Mines, and discussed with them.

MINING EXCURSIONS. MINING ENGINEERING 4—In connection with the courses in Mining Engineering, Metallurgy, and Mineralogy, trips will be made to mining districts of Arizona and Sonora, usually one or two weeks in March or April. These trips are required of all candidates for the degree of B. S. in Mining Engineering.

The purpose of these trips is to afford the mining students an opportunity for close study and inspection of mining and metallurgical plants, and of rock formations and of minerals of commercial value. The students are accompanied by two professors, and every effort is made to make the trips of the greatest practical value. The visits are carefully scheduled and notes, with sketches, measurements and photographs are taken, and elaborated into comprehensive report by each student after the return. These trips are of incalcuable assistance to the lecture, text-book and draughting room work.

The subjects of special consideration are transportation, both above and below the surface, mine surveying, methods of stoping and timbering, the best treatment for each ore, assaying and furnace charges, smelting practices, concentration of low grade ores, power generation, pumping and water supply, and mill construction.

During 1905-6 the mining districts of Tombstone, Bisbee, Nacozari, and Cananea, and the metallurgical plants at Douglas were visited in this way. The thanks of the University are due the superintendents of the various plants visited, for their efforts and care in acquainting the students with the works under their management.

PHILOSOPHY

MRS. STANLEY, (SEPTEMBER TO JANUARY) MR. FERREE, (FEBRUARY TO JUNE.)

PHILOSOPHY 1. HISTORY OF PHILOSOPHY—A study of the basal concepts and fundamental problems of philosophical thought as developed historically. Lectures, recitation and assigned reading. Text-book Schwegler's "History of Philosophy." 2 hrs., both semesters. 4 units.

PHILOSOPHY 2. EVOLUTION—A study of the term in its widest extention, as the law of the cosmic process; its significance in the various departments of science and its bearing on philosophical aud ethical thought. Reading in Fiske's "Cosmic Philosophy;" Le Conte's "Evolution and its Relation to Religious Thought;" Wallace's "Darwinianism;" Spencer's "Principles of Sociology;" Bagehot's "Physics and Politics," and Howison's "Limits of Evolution." Lectures and discussions. 2 hrs., both semesters. 4 units.

PHILOSOPHY 3. PSYCHOLOGY—A special consideration to the subject as applied to teaching. Lectures, recitations and collateral reading. Open to Juniors and Seniors. 4 hrs., first semester. 4 units.

PHILOSOPHY 4a. EXPERIMENTAL PSYCHOLOGY—The work is observational throughout and is designed especially to develop power to do first-hand work in the subject: (a); introspective exercises and daily class discussions, in which the student is trained to analyze his own consciousness, to describe its processes and their modes of connection, and its states; (b); experimental variation and control; (c); psychological literature and psychological theory, discussed in lectures, text-book and collateral reading. The work is based upon Titchener's "Outlines of Psychology" and Titchener's "Manual," Qualitative Series.

*PHILOSOPHY 4. PEDAGOGY—An account of educational evolution, both as a culture fact in the history of civilization and as a foundation for professional work; lectures, giving a brief but comprehensive outline of school systems, a special study of leading educators such as Comenius, Pestalozzi, Froebel, Mann and others; methods of teaching, school management, and school law. Arrangements have been made with the Tucson city schools to use the Holliday school as a practice school for this class. Open to students who have taken Philosophy 1. 4 hrs., second semester. 4 units.

*PHILOSOPHY 5. LOGIC—Text-book, Jevon's "Logic;" reading from Mill, Hamilton, Thompson and

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*Omitted 1905-6.

others. Open to Juniors and Seniors. 4 hrs., first semester. 4 units.

*PHILOSOPHY 6. ETHICS—Theoretical and practical ethics; view of the historical development of the science; origin and development of the moral consciousness; application of the principles of ethics to the problems of life. Lectures, discussions and assigned reading. Open to Juniors and Seniors. 3 hrs., second semester. 3 units.

PHYSICAL CULTURE.

MR. MURRAY.

This department is organized to supply the opportunity for such physical work as experience has shown to be necessary under modern conditions, to counteract the deleterious effects of close application to mental work and to favor the attainment by the student body of a high state of physical efficiency.

It is intended that a thorough physical examination, including an examination of the eyes, heart and lungs, shall preface the work of every student in physical culture. This examination will be made as soon as possible after the student enters the University and at intervals during his or her course for safety and for determining the results of the work. Anthropometric cards and charts are platted for the students when desired. In special cases the University reserves the right to require a complete physical examination by a designated physician at the expense of the student.

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*Omitted 1905-6.

In addition to the regular class drill a certain part of which consists of training and contests in athletic sports, the University is represented by teams in football, baseball, track and field, tennis, and basket-ball. Every facility is provided for track and field athletics. The field on the campus contains gridiron, baseball diamond, tennis and basket-ball courts, sprinting paths, jumping and vaulting pits.

The course for women consists of systematic exercises for the harmonious development of the entire body, besides a course for the development of grace of movement and the production of symmetry of physique. Special corrective machinery is supplied for this department, so that even the weakest student may be given proper and healthful exercise. Those pursuing this course are required to provide themselves with a gymnasium suit, consisting of a blouse waist and divided skirt with the regulation gymnasium shoes. The suit requires four yards of double width, 54-in. dark blue serge. The waist has a sailor collar trimmed with white braid. The Butterick pattern may be used or ready-made suits may be had at the gymnasium for $3.75.

The plan of work for the men is three-fold: general graded class work, corrective work, and elective athletic work. The athletic work is taken in combination with the class work in order that the student by this combination may obtain the best possible development. The corrective work is given under special supervision to all those who are in need of special development, and, also to those who are unable to do the regular class work. The students doing work in the gymnasium are required to wear the regulation gymnasium shoes and suit. The average cost of this suit is about $3.75.

PHYSICS.

PROFESSOR TOLMAN, (SEPTEMBER TO FEBRUARY) MR. FERREE, (FEBRUARY TO JUNE) MR. WILCOX.

The object of this course is to acquaint the student with the physical principles which underlie the higher courses of chemistry, mechanics, and engineering. Special attention is therefore given to the study of force and energy, the physics of liquids and gases and heat. One-third of the course is devoted to the study of electricity, for which the laboratory is especially well equipped.

PHYSICS 1, 2. Lectures, recitations and laboratory work. Open to students who have taken a course in elementary physics and Mathematics 1. 2 hrs., and 2 two-hour periods in the laboratory, or an equivalent, both semesters. 8 units.

SOCIOLOGY.

MR. RUTHRAUFF.

SOCIOLOGY 1. ELEMENTS OF SOCIOLOGY—A study of the nature, origin and development of the social forces; a treatment of the phenomena and laws of society as it is, including whatever conduces to or modifies human association. Fairbank's "Introduction to Sociology" will be used as a guide, and supplemented by lectures, collateral reading, and reports. Open to Juniors and Seniors. 3 hrs., first semester. 3 units.

SOCIOLOGY 2. CHARITIES AND CRIME—A consideration of social pathology, including an examination of the origin and nature of the dependent, defective, and delinquent classes. A study will be made of the principles and methods of relief; cause of crime; prison systems; juvenile offenders; preventive measures, etc. Guide, Warner's "American Charities." Prerequisite, Sociology 1. 3 hrs., second semester. 3 units.

SPANISH.

ASSISTANT PROFESSOR TURRELL

SPANISH 1, 2. First semester: "Introduccion á la Lengue Castellana" (Marion and Des Garennes); Elementry Spanish Reader. Second Semester: Hills and Ford's Spanish Grammar complete. Reading of Alarcón's "El Capitán veneno," or "Novelas escogidas," etc. Composition, dictation and oral work. 5 hrs., both semesters. 8 units.

SPANISH 3, 4. First Semester: Composition and Syntax. Reading of Galdós' "Marianela," Alarcón's "El Niño de la Bola," or "El Final de Norma." Second Semester: Valdés', "José," Galdós' "Doña Perfecta." One hour each week is given to composition and letter-writing. 5 hrs., both semesters. 8 units.

SPANISH 5. Lectures in Spanish on the history of Spanish literature. The clasical Spanish drama. Study of the age of Lope de Vega and Calderón. Reading of Lope's "La Estrella de Sevilla," Calderón's "La Vida es Sueño." 3 hrs., first semester. 3 units.

SPANISH 6. Recent Spanish literature, with particular study of the modern drama. Reading of Echegaray's "Ó Locura ó Santitad," and "El Gran Galeoto," Larra's ' Partir á Tiempo," Nuñez de Arce's "El Haz de Leña," Galdós' " Electra," etc. 3 hrs., second semester. 3 units.

SHORT COURSE OF INSTRUCTION IN MINERALOGY AND ASSAYING.

In order to meet the needs of persons who desire to learn the art of assaying the common ores, and who have not the time required for a full four-years course of study, the Board of Regents have approved a short course of instruction in practical assaying, mineralogy, metallurgy, and allied subjects.

This course commences with the first semester in each year and requires at least two years. Students are advised, however, to take the regular course in metallurgy or mining engineering, if possible, since in two years they cannot expect to make more than a beginning in the subjects.

REQUIREMENTS FOR ADMISSION.

Those desiring to take this course are required to be at least eighteen years of age, to have good health, and to have a knowledge of English, physics, and algebra to quadratics, sufficient to enable them to pursue the course with advantage. This knowledge will be tested by examinations.

The fees and tuition are the same as for other departments. Each student is required to pay the cost of materials, glassware, and apparatus used by him. For this purpose a deposit of ten dollars will be required in advance each semester and any balance will be refunded.

The right is reserved to vary this course according to the aptitudes or necessities of those concerned.

FIRST YEAR.

General Chemistry, one semester.

Qualitative analysis, one semester.

Mathematics, two semesters.

Practical free-hand drawing and shopwork, or physics, two semesters.

SECOND YEAR.

Mineralogy and blow-pipe analysis, two semesters.

Assaying, one semester.

Qualitative analysis and wet assaying, one semester.

Mathematics, two semesters.

Geology, two semesters.

BUREAU OF MINES AND ASSAYING.

A separate department of the School of Mines under the name of "The Bureau of Mines and Assaying" has been established to receive and work ores, and to make assays and analysis of ores, minerals, mineral waters, and petroleum.

In accordance with the act of the Legislature of the Territory, approved March, 1897, and amended in March, 1899, assays of ores and minerals are made for the prospectors and miners of Arizona, and for others at fixed rates established by the law, and tabulated below. To meet the requirements of this work a special laboratory building of brick has been erected and maintained. It is fitted up as a complete assay office, and is provided with a double large brick coke-furnace, a melting furnace and gasoline furnaces in a fire-proof room. There are in addition, a parting and wet assay room, a balance room, and office.

Extreme accuracy and excellence of work are considered of more importance than pecuniary profits. All assays are made in duplicate and if not accordant are repeated. A special expert assayer is employed, and the assays are not made by students, who receive their instruction in the regular laboratories of the University.

The money received for assaying is deposited monthly to the credit of the assay fund which is used to pay the assayer and the cost of materials and apparatus.

SCHEDULE OF RATES.

In accordance with the Legislative enactment approved March 3, 1899, the Regents of the University of Arizona have established the following rates for assaying ores:

ASSAYING ORES FROM ARIZONA.

Silver and gold, or either	$1.00
Silver, gold and copper	2.00
Copper, or lead, or zinc, or iron (one)	1.00
Gold, silver, copper and lead	2.50
Gold, silver, copper and iron	2.50
Gold, silver, copper and zinc	2.50

For other determinations and analytic work, such a rate will be charged as the Director of the School of Mines may in each instance fix.

PAYMENT IN ADVANCE REQUIRED.

The director is required, in all cases, to hold the assay until the fee or charge therefor is paid. Remittances may be made by check or money order; or the money, securely wrapped, may be sent with the sample.

RATES FOR SAMPLING OR WORKING ORES.

Lots of 100 pounds or less, including assays of three metals	$5.00
Each additional 100 pounds, to 500 pounds	1.00
Over 500 pounds to 1 ton	10.00
Each additional ton	4.00
Ordinary stamp mill test and plate amalgamation for first ton or fraction of a ton	20.00
From 1 to 2 tons	30.00
Pan amalgamation, including crushing and assays, ton	20.00

Large lots proportionately less; small lots more in proportion.

CYANIDE PROCESS.

The School of Mines is prepared to make experimental tests of ores and tailings by the cyanide process, in large or small quantities, at rates to be agreed upon with the Director.

Working tests and experiments by other processes may be undertaken at rates to be agreed upon in each instance, depending upon the amount of materials, time and labor required

CONCENTRATING (INCLUDING ALL ASSAYS)

Wet or dry test of lots under 500 pounds	$15.00
500 pounds to 1 ton	20.00
Each additional ton	7.00

GRATUITOUS QUALITATIVE TESTS.

The determination of the nature of rare and peculiar minerals, not requiring a chemical analysis, or assay, is made gratuitously. Samples sent for this purpose should be in their original condition as broken out, and not crushed to a powder or pulp. Tests requiring determinations of the presence of gold or silver must be paid for at assay rates. Samples may be sent by mail at the rate of one cent per ounce. They should be distinctly labeled inside the package with the name of the sender, and a letter should be posted at the same time giving the full name and address, and inclosing a stamp for the reply. This offer of free examination is intended to apply to minerals unknown to the sender and does not cover special tests for precious metals or for any metal the presence of which is usually determined by an assay.

BULLION ASSAY.

Special attention is given to the retorting and melting of bullion and the assays of gold bars for shipment.

HOW TO SEND SAMPLES.

For small samples, under four pounds in weight, the most expeditious and cheapest way is to send by the ordinary mail. The postal laws permit the name of the sender to be written and enclosed in the package. Each sample should be labeled by a slip of paper, inside, giving the name and locality of the claim and the name of the sender.

The name of the claim is desired in order that the value and distribution of the mineral wealth of the Territory may be better known.

Special rates for freight on consignments to the "Director of the School of Mines," are granted by the Southern Pacific railroad from points in Arizona. Ask the agent at shipping point for particulars.

All business communications, checks and money orders should be addressed to the

ARIZONA SCHOOL OF MINES,
KENDRIC C. BABCOCK, Pres.
Tucson, Pima Co., Arizona.

THE AGRICULTURAL EXPERIMENT STATION STAFF.

Kendric Charles Babcock, Ph.D.	President of the University.
Robert H. Forbes, M. S.	Director and Chemist
Vinton A. Clark, B. S.	Agriculturist and Horticulturist.
Frederick W. Wilson	Animal Husbandman
John James Thornber, A. M.	Botanist
Albert Earle Vinson Ph. D.	Associate Chemist
T. D. A. Cockrell,	Consulting Entomologist
Walter Harold Mueller	Secretary to the Director

ORGANIZATION AND WORK.

The Agricultural Experiment Station is a legally constituted department of the University, whose purpose is to "aid in acquiring and diffusing * * * useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and applications of agricultural science."

With the above objects in view, the organization of the station includes the departments of administration, agriculture and horticulture, animal husbandry, botany and chemistry, the whole or a major portion of the time of one or more members of the Station staff being devoted to each department of the station work. Provision is made for meteorological work also, though to a less degree.

Owing to the wide variation in agricultural conditions in Arizona, it has been found of advantage to distribute the work so that each department is located, so far as possible, in that region most favorable to the accomplishments of its own special results. According to this principle, the various lines of Experiment Station work have been distributed as follows:

The Director's office and the departments of Botany and Chemistry are maintained at Tucson in the University buildings. Through this arrangement, the Experiment Station profits by the buildings and libraries of the University, while the University is benefitted from time to time by the teaching ability of members of the Station staff. It has been found that from this base of operations the three great agricultural districts of the Territory—Salt River Valley, the lower Colorado and the upper Gila—are accessible with equal convenience for field work and observations.

On the same ground—fitness of location for the work undertaken—the Experiment Station farm has been maintained and strengthened at Phoenix. Salt River Valley is intermediate in elevation, in situation, and in mean yearly temperature between the other two important farming districts above mentioned, and for this reason the agricultural and horticultural results obtained there are capable of the most general application in the territory at large.

On the same principle again, the date palm orchard, conducted in co-operation with the United States Department of Agriculture, is located in the alkaline district south of Tempe, where a successful demonstration of this palm as a commercial fruit producer will be of the greatest value, creating use for great areas of alkaline land in the arid Southwest.

Another orchard has just been planted on a tract near Yuma.

The range station also, for the study of worn-out range country with a view to its reclamation to usefulness is located in a typical district near Tucson, and is conducted under the auspices of the department of botany, co-operating with the United States Department of Agriculture.

The services of specialists in various subjects, such as entomology, meteorology, and soil survey work have also been secured from time to time.

The results of the Experiment Station work are made public at frequent intervals in the bulletins and reports of the Station. These publications are made in two series: first, the longer and more technical bulletins, stating in considerable detail the investigations as they mature; and secondly, the "Timely Hints for Farmers," which are brief writings issued at the time when they will be most useful, written in plain language, and presented in popular form. The annual reports also are for the most part written popularly, and afford a convenient and reliable summary of each year's work as it comes to completion.

The Experiment Station work conducted and published on the lines indicated above has a two-fold value. In the first place the suggestions made or derived from the investigations of the Station are of direct material profit to the agricultural public and are intended to be immediately applied to advantage in the betterment of agricultural practice. In the second place, these writings are intended to serve an educational purpose, inasmuch as they are so presented as to constitute lesson sheets for the benefit of the careful reader. It may therefore be considered that the Experiment Station reaches a class of some thirty-five hundred readers in the Southwest at frequent intervals by means of its "Timely Hints" and other publications. The operations of the range study tract at Tucson, the Experiment Station farm at Phoenix, and the date palm orchards at Tempe and Yuma serve also as an object lesson to the adjacent public.

It is believed that this distributed and mobile organization is especially effective, not only for the purposes of the Experiment Station, but also for those of the University as well, since it allows the station to conduct its work in localities suitable for the accomplishment of results; and again, it causes the public to become better acquainted with the Territorial University, of which the Station is a department.

An appropriation of eleven thousand dollars, made for the use of the Station by the Twenty-second Legisture, very satisfactorily attests the estimation in which the work of the Station is held. The appropriation is intended for the improvement of the date orchard; for purchasing livestock and buildings for the farm; for issuing publications; and for holding farmers' institutes and short courses of instruction throughout the Territory.

Provision therefore, is made for the symmetrical development of this work in the Territory, both experimentally and educationally; and, prospectively, "the farmers' college" bids fair to increase in usefulness to the growing agricultural interests of the Territory.

PREPARATORY DEPARTMENT.

INSTRUCTORS.

KENDRIC CHARLES BABCOCK, Ph.D., President, Civics.

SIDNEY CARLETON NEWSOM, A. M., English.

JOHN JAMES THORNBER, A. M., Botany, Biology.

CHARLES ALFRED TURRELL, A. M., French, German, Spanish.

WILLIAM WHEELER HENLEY, A. B., Shopwork and Drawing.

LIEUT. SAMUEL V. McCLURE, Military Science and Tactics, Mathematics.

WILLIAM GEORGE MEDCRAFT, A. M., Mathematics.

WILLIAM M. RUTHRAUFF, A. M., History.

GLENN A. WILCOX, B. S., Science.

A. MAY ASHWORTH, A. B., English.

MARION CUMMINGS STANLEY, A. B., Latin.

LEVONA PAYNE NEWSOM, Ph. D., Latin.

PAUL MURRAY, A. B., Physical Training.

ESTELLE G. LUTRELL, A. B., English.

JOSEPH CONRAD HOLTY, M. S., Chemistry.

FREDERICK E. TALMAGE, B. L., Bookkeeping, Stenography, Typewriting.

ALICE SPITLER, B. S., Domestic Science.

GENERAL INFORMATION.

In this department the University offers the work of a well-organized, four-years high school, with the added advantages of shopwork and drawing and of domestic science. The general library and gymnasium are open to all students in this department.

The equipment of the scientific laboratories is available for use in this preparatory work, whenever it can be used advantageously, and makes possible strong work in elementary science. The instructors in this department are assisted by the professors of the college departments, several of whom regularly conduct preparatory classes. By reference to the course of study which follows, it will be seen that it offers a comprehensive training for those who may not be able to pursue their studies farther, while it gives a good preparation for college.

ADMISSION.

Admission to regular standing in the first year of the preparatory course presupposes the completion of the work of the eighth grade of the public or parochial schools. Students who do not bring certificates showing the completion of this work, must take examination to test their ability to pursue profitably the work of the first year.

The Board of Regents on April 10th, 1906, voted that after September 1, 1906, no pupils who have not completed the work of the ninth grade (or the first year of a high school) will be admitted into the University from cities in Arizona having more than 5000 population.

All students entering the preparatory department will be required to take an examination in oral reading. To remedy notable deficiency in this subject, the University will require extra work in addition to other studies.

In all cases in which the preparation of a student in a particular subject proves to be deficient, the University reserves the right to require the student to secure at his own expense the help of an approved coach until the deficiency is remedied.

COURSE OF STUDY.

The following course of study will be required of all students who fit themselves at the University for entrance to the Freshman class in 1906. Such variations from it will be made during the next year as will adapt it to the case of students already in the sub-collegiate department, who took part of their work under the former requirements.

Military drill is required of all able-bodied male students throughout the course. Physical training is required of all students, unless they are excused by the President upon presenting a certificate from one of the University physicians. The young men have drill three times per week and exercise in the Gymnasium twice. The young women have physical culture three times a week.

The language begun in the second or third year must be pursued for at least two years in order to secure credit towards graduation.

Though the subjects are for convenience grouped by years in the following schedule, the departmental method is followed. In the description of courses, the subjects are arranged by groups or departments in the consecutive order in which they are taken up and students will be required to take them in this order. Aside from this sequence the ability of each student must determine what subjects will be pursued at any given time, due regard to be given to the proper balance of subjects. The wishes of parents will always be given careful consideration in making up the schedule of work for each student, but the final decision in the matter must rest with the committee on registration, which is composed of persons who have had long experience in secondary and collegiate teaching. Individual attention will be given to the needs of each student.

To each student who completes the studies of this course receiving a total of sixteen units (a unit representing a subject pursued for one year with five, or four, recitation periods per week), a certificate stating that fact will be given.

This certificate will entitle the holder to admittance to the corresponding University courses of instruction without examination.

FIRST YEAR.

(The figures represent recitations per week.)

English	5	Physical Geography	3
Algebra	5	Drawing and shop work, or Domestic Science	5
Greek and Roman History	2		

SECOND YEAR.

English	5	*French (first year)	5
Algebra	5	*Spanish (first year)	5
European History	4	*Drawing and shopwork or Domestic Science	5
*Latin (first year)	5		
*German (first year)	5	*Bookkeeping (7 hours)	5

THIRD YEAR

English	5	*French (second year)	5
Plane Geometry	5	*German (first year)	5

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*Subjects thus marked are elective. One elective must be chosen in the second year. In the third year and in the fourth year, electives making up at least nine hours must be chosen.

*Chemistry	5	*German (second year)	5
*Drawing and Shopwork	5	*Spanish (first year)	5
*Latin (second year)	5	*Spanish (second year)	5
*Greek (first year)	5		
*French (first year)	5	*Stenography	5

FOURTH YEAR

English	5	*Greek (second year)	5
Civics	3	*French " "	5
Physiology	2	*German " "	5
†Solid Geometry and *Algebra	4	*Spanish " "	5
*Physics	5	*Parliamentary Practice	1
*Latin (third year)	4		

ENGLISH.

The English of the preparatory course is based upon what is known as the entrance requirements of New England colleges. The work is in general divided into three parts: Classics, studied in class, composition and grammar work done partly in class and partly outside; and supplementary reading done largely outside the class-room. All these parts of the work may be carried on at the same time, as the circumstances of the class seem to require, the classics and supplementary reading forming the basis of a large part of the work in grammar and composition. Throughout the course, however, a primary aim is to develop the student's individual power

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*Subjects thus marked are elective. One elective must be chosen in the second year. In the third year and in the fourth year, electives making up at least nine hours must be chosen.

†Solid Geometry and Plane and Spherical Trigonometry beginning September 1907.

of expressing himself in words. The time allotted to these three phases of English varies from year to year, increasing attention being paid to the appreciative and critical faculty as the course advances. In the fourth year a brief outline history of English and American literature occupies about one-third of the year's work in English.

Five hours each week throughout the course are given to English. According to the following general outline selections from the list below are made at the discretion of the teacher, preference being given to the New England College Entrance Requirements, which are marked by an asterisk. *

FIRST YEAR.

ENGLISH GRAMMAR AND COMPOSITION receive one half of the time of the first year.

CLASSICS. Longfellow's Tales of a Wayside Inn, Bryant's Water Fowl, Planting of the Apple Tree, Forest Hymn, the Antiquity of Freedom, Lowell's shorter poems, Tennyson's Enoch Arden, Miller's Daughter.

SUPPLEMENTARY READING. Talisman, Tom Brown at Rugby, Last of the Mohicans, The Sketch Book, The Man Without a Country, The House of Seven Gables, *Ivanhoe.

SECOND YEAR.

COMPOSITION AND GRAMMAR. As in first year with attention to figures of speech, reproducing the work of classic authors, elementary etymology, exercises in exposition, narration and description.

CLASSES. *The Vision of Sir Launfal, *The Ancient Mariner. The Ballad Book (Bates), Sohrab and Rustum and *The Idylls of the King, studied as in first year.

SUPPLEMENTARY READING. Deserted Village, Lorna Doone, Tale of Two Cities, Life of Goldsmith, Quentin Durward, The Critic on the Hearth.

THIRD YEAR.

Composition and Rhetoric are continued with emphasis on elementary argumentation and exposition.

CLASSICS. Julius Cæsar, *The Merchant of Venice, The Princess, *Sir Roger de Coverley, Poems of Burns, Carlyle's Essay on Burns. These are for geneal reading as in the first and second years. For careful reading are the following: *Milton's L'Allegro, Il Penseroso, Comus, Lycidas; *Macaulay's Essay on Milton. Special attention will be given to the author, his times and surroundings, and his style.

SUPPLEMENTARY READING. Sesame and Lilies, Backlog Studies, Treasure Island, Kidnapped, Silas Marner, Alhambra.

FOURTH YEAR.

COMPOSITION AND GRAMMAR. Exercises in narration and description for flexibility and ease of expression and general preparation for entrance requirement "b" on page 36 of this Register.

CLASSICS. *Burke's Speech on Conciliation, Macaulay's *Life of Johnson, Essay on Addison, *Macbeth. The Tempest, Midsummer Night's Dream. These are all for thorough study.

HISTORY OF ENGLISH LITERATURE. From the earliest times, with text-book as guide, with a review in chronological order of the classics studied during the four years of the course, to prepare for examination in entrance requirement "a" on page 35 of this Register. Special attention is paid to Keats, Shelley, Tennyson and other representative poets of the nineteenth century.

SUPPLEMENTARY READING. *Vicar of Wakefield, The Making of an American, The Newcomes, Oliver Twist, American Orations and Addresses.

MATHEMATICS.

FIRST YEAR.

ALGEBRA. Introduction, factoring, fractions, simple equations, simultaneous equations, and special problems.

SECOND YEAR.

ALGEBRA. Involution, evolution, theory of exponents, radicals, quadratic equations, and proportion.

After 1907 but two years will be devoted to preparatory algebra. The first year's work will be required for entrance, and additional courses will be outlined for more extensive research than those herein offered.

THIRD YEAR.

Plane geometry, including thorough work in original exercises.

FOURTH YEAR.

First Semester, solid geometry with original exercises.

Second Semester, algebra, comprising theory of expenents, quadratic equations, simultaneous equations and variation.

Beginning the second semester 1907 trigonometry will be required of fourth preparatory students instead of advanced algebra.

MECHANIC ARTS.

This work consists of both drawing and shop work, between which subjects the student's time is about equally divided. The course covers two years and is designed to furnish a thorough elementary knowledge of manual training as taught in the secondary schools of the country.

FIRST YEAR. Drawing—Freehand sketching in perspective and orthographic projection. Reinhart's lettering, free-hand working drawings.

Shop-work—"Sloyd," care and use of wood-working tools.

SECOND YEAR. Drawing—Mechanical drawing and geometrical problems.

Shop-work—Forging, joinery, wood-turning.

SCIENCE.

It is the object of the courses in science to initiate the student into the processes and methods used in laboratory work; to teach close observation, careful manipulation and logical deduction; to acquaint the student with the fundamental facts of the various branches of science and to give full practice in the use of good English in describing various observations and experiments. To insure better results in the notebooks, they will all be passed upon by one ot the instructors in English.

PHYSICAL GEOGRAPHY. This course combining the laboratory method with the text-book, aims to give the pupils training in exact observation of familiar phenomena, like distance, weight, pressure of liquids and gases, temperature, winds, clouds and the habits of plants and animals. The natural forces producing erosion, formation of soils and rocks, the processes of nature as seen in seed germination and plant growth (with demonstrations with the microscope) will be discussed, with frequent experiments and field excursions.

CHEMISTRY. A year's work with the text and in the laboratory, in such proportions as the instructor decides upon. Each student must keep a note-book in which he describes the process and results of his laboratory work.

PHYSICS. A thorough course consisting of three recitation periods and four laboratory periods per week, carried on along the lines laid down for the senior year in secondary schools. Each student must keep a note-book in which a minimum number of experiments must be written up.

PHYSIOLOGY. This course aims to combine careful laboratory instruction, with application of the knowledge to practical personal hygiene. This work will be co-ordinated with that of the department of Physical Culture. For part of the instructions the young men and women will meet in separate sections.

DOMESTIC SCIENCE.

The course in domestic science for young women is arranged to give instruction in the science and art of home economics, and to raise home making to a higher plane. It includes all branches of home science, hygiene, chemistry of cooking and cleaning, preparation of all food stuffs, both fancy and elementary, nursing and food for the sick, marketing, and the management of servants.

Two courses are offered in sewing. The first year includes fancy needle work, and the second year drafting, cutting and dressmaking. The course includes laundering laces and ribbons.

Social duties and customs of society are considered with peculiar care. The students have access in the domestic science library to all the best authorities.

HISTORY.

The aim of the work in history is to lead the pupil to see the development of races and nations along political, social and religious lines and to arouse in him a love for the subject and a habit of broad and discriminating reading.

The work of the first year consists of a survey of the development and characteristics of the Greek and Roman civilizations. A text such as Wolfson's or West's will be supplemented by collateral reading and a notebook.

The work of the second year includes mediaeval and modern history. The aim is to give the students an idea of the essential unity of history and the leading facts in the political development of races and nations. Adams' European History is used, supplemented by the reading of references contained therein.

Hart's "Actual Government" is the text-book in civics. The historical development of the subject is made prominent while practical problems, such as taxation and municipal government, are made the subjects of special investigation and study.

LATIN, GREEK, FRENCH, GERMAN AND SPANISH

For an outline of the courses in Latin and Greek see page 37, under requirements for admission.

For an outline of the courses in French, Spanish and German see pages 52, 54, 71.

BOOKKEEPING AND COMMERCIAL PRACTICE.

Bookkeeping is taught by the modern budget system. The work is individual and each student may progress as fast as his time and ability permit. The course is thorough in all the details of office practice. Students are made familiar with different filing cabinets, the filing of letters, the use of card ledgers, the copying and indexing of letters and bills in copy books The course includes instruction in commercial law, with special emphasis laid on the ordinary forms of commercial paper and the different endorsements. The department is equipped with the latest vertical files, cabinets, letter press, and office sundries. All students in bookkeeping are required to take some other branch of mathematics and must show proficiency in English.

STENOGRAPHY AND TYPEWRITING.

A complete course in stenography is offered. The Gallagher-Marsh system, a system which has received the highest endorsement of leading court reporters on the Pacific Coast and which has been adopted by the Boards of Educations in the largest cities of California, has recently been adopted. The amount of time allotted for this work has also been increased from five hours to eight hours per week. The object of the course is to train students so that they may become practical stenographers. With this end in view particular stress is laid upon neatness, filing, copying, and indexing. This branch of the commercial department is equipped with up-to-date filing cases, office sundries, and six typewriters, four of which are Remingtons, one an Oliver and one the L. G. Smith Visible. Five of the typewriters are new. Students taking this work are required to have had one year in English, and to take English with this course.

ALUMNI ASSOCIATION.

The Alumni Association of the University of Arizona was organized on the second day of June, 1897.

The object as expressed in its constitution is: "To promote the interests of the University to secure unity among its graduates and to foster an attachment to our Alma Mater."

Concerning the last two clauses of this declaration it may be said that the organization is carrying out their meaning in a manner which leaves little if anything to be desired. There is no doubt regarding the loyalty of the graduates to the University of Arizona and no question of their unanimous desire for the prosperity of the institution.

The first clause of the above declaration, however, deals with a matter which in a sense admits of more growth than those just mentioned, and the members of the association realize that there is room for further progress in the accomplishment of this purpose.

It will be the aim of the alumni association to create a deeper feeling of interest and pride in the University of Arizona among the people of the Territory.

1895

Charles Oma Rouse, B. S., Superintendent of Schools, Pima County, Tucson, Arizona.

Mercedes Anna Shibell, B. S., [Mrs. A. J. Gould,] Tucson, Arizona.

Mary Flint Walker, B. S., [Mrs. Pearl Adams], Benson, Arizona.

1897.

Edward Marshall Boggs, C. E. [nunc pro tunc] Chief Engineer Oakland Electric Railways, Oakland, Cal.

Clara Cramond Fish, B. S., [Mrs. F. C. Roberts], Tucson, Arizona.

George Ojeda Hilzinger, B. S., Teller in Bank, El Paso, Texas.

Mark Walker, B. S., Metallurgist, Tombstone, Arizona.

1898.

Hattie Ferrin, B. S., [Mrs. Charles Solomon], Solomonville, Arizona.

Granville Malcolm Gillett, B. S., Draughtsman in Surveyor General's Office, Phoenix, Arizona.

Minnie Watts, B. S., [Mrs. W. B. Smith], Altaville, Cal.

*John Desha Young, B. S.

1899.

Robert L. Morton, B. S. Assayer, Yuma, Arizona.

1900.

Ida Clarissa Flood, B. S., [Mrs. G. Dodge] Oakland, Cal.

Samuel Pressly McCrea, B. S., A. B., Principal of High School, Redwood City, Cal.

Charles Pierce Richmond, B. S. Cyanide Manager, La Union, Salvador, Central America.

Florence Russell Welles, B. S. [Mrs. Wm. Angus], Los Angeles, California.

---

*Died April 8, 1899.

1901.

Rudolph Castaneda, B. S., Surveyor, Tucson, Arizona.

Clara Ferrin, B. S., Teacher, Tucson, Arizona.

George Millard Parker, B. S., Denver, Colorado.

David Hull Homes, B. S., (nunc pro tunc) Professor of Drawing, University of Arizona, Tucson, Arizona.

1902.

Andrew Gilbert Aiken, A. B., B. S., Surveyor, Canton, New York.

Moses Blumenkranz, B. S., Assistant Superintendent Shannon Copper Company, Metcalf, Arizona.

Ruth Brown, Ph. B. [Mrs. Wilkins Manning] Tucson, Arizona.

Felix Grundy Haynes, B. S., Casa Grande, Arizona.

Rosa Belle Parrott, Ph. B., Teacher, Roseburg, Oregon.

Philip Matthew Reilly, B. S., Mining Superintendent, Cumpas, Sonora, Mexico.

Bertram L. Smith, B. S., Assayer, Silver Bell, Arizona.

Bessie Smith, Ph. B. (Mrs. Earle Davis), Tombstone, Arizona.

Walter James Wakefield, Assayer, Tucson, Arizona.

1903

Advanced Degrees:

Hon William Herring, LL. D., Tucson, Arizona.

John William Gorby, B.A., (Marietta) M. A., teacher. Chicago, Illinois.

Benjamin Franklin Stacey, (B. A., B. D., Lombard), M. A., Teacher, Pasadena, California.

Richard Lamar Drane, B. S., Chief Draughtsman, G. V., G. & N. Ry. Tucson, Arizona.

George Mark Evans, (LL. B., Michigan,) Ph. B., Instructor in University of Arizona, Tucson, Arizona.

Leslie Alexander Gillett, B. S. (Mining), Draughtsman, Surveyor General's Office, Phoenix, Arizona.

Georgia Ann Holmesley, Ph. B., Teacher, Clifton, Arizona.

Edward Horton Jones, B. S., Assayer, Magdalena, Sonora, Mexico.

John Williard Prout, Jr., B. S., Superintendent Mowery Mine, Patagonia, Arizona.

Thomas Edward Steele, B. S., Assayer, La Cananea, Sonora, Mexico.

1904

William Burnham Alexander, B. S., County Surveyor, Pima County, Tucson, Arizona.

Elbert John Hollingshead [Kimble] B. S., Teacher, Brownsberger School, Los Angeles, Cal.

Frank Caleb Kelton, B. S., Draughtsman, Tucson, Arizona.

Estella Markham Prout, Ph. B., Denver, Colorado.

John Williard Prout, Jr., B. S. (Mining). See 1903.

1905

Ora Elinor Norway, Patton, Cal.

MILITARY ORGANIZATION 1905-6

UNIVERSITY OF ARIZONA CADET BATTALION, NATIONAL GUARD OF ARIZONA.

Commandant of Cadets ....
Lieutenant S. V. McClure, U. S. A.; Major, N. G. A.

STAFF.

Captain	Hugh M. Wolflin
Adjutant	First Lieutenant Burrell R. Hatcher
Quartermaster	First Lieutenant William F. Drew
Sergeant Major	Robert B. Murphey
Quartermaster Sergeant	Edward W. White

COMPANY A.

Captain	J. Elmer Johnson
First Lieutenant	Fletcher M. Doan
First Sergeant	Andrew P. Martin
Sergeant	Harold D. Steinfeld
Corporal	John H. Culin
Corporal	Thomas S. O'Connell
Corporal	Warren A. Grossetta
Corporal	Norman A. Rose
Corporal	Leon H. Strong

COMPANY B.

Captain	Albert R. Buehman
First Lieutenant	J. Clyde Hoyt
First Sergeant	George W. Kohler
Sergeant	Lynne F. Hazzard
Sergeant	Fred Barthels
Corporal	Rollin Brown
Corporal	Vance P. Edwards
Corporal	John M. Ruthrauff

TRUMPETERS.

Sergeant	Horace R. Holbrook
Private	Norman M. Barker
Private	Julian Huddleston

COLOR GUARD.

Color Sergeant	Frank W. Rose
Acting Corporal	Howard W. Estill
Private	Homer B. Batte

REGISTER OF STUDENTS

1905-6

GRADUATE STUDENTS.

Begg, William, A. B. (Toronto) Engineering, Geology, ...El Oro, Mexico,
Ferrin, Clara, B. S., Arizona, Sociology, Philosophy. ....Tucson, Arizona.
Holty, Joseph Gerard, Wisconsin, Metallurgy.....Tucson
Williams, David Carl, B. L., MacMinnville College, Philosophy ....Tucson

SENIORS

Clegg, Chester Bennett..Roosevelt
Gebb, John Wesley..Jerome
Kilgore, Roy Bartley..Williams
Mead, Roy Gibbons..Tucson
Moore, Roy Webb..Tucson
Murphey, Carobel, A. B. (Cox College,)............Tucson
Reid, Ida Christina..Tucson
Wooddell, Minnie Louise..Tucson

JUNIORS

Brown, Harriet Estella..Tucson
Croasdale, Lawrence Broadhead.. ....Delaware Water Gap, Pa.
Lee, Montrose Lucius..Omaha, Neb.
Meyers, George Higgins, ...South Bend, Indiana
Purcell, Weda Ina..Tucson
Wolflin, Hugh Maupin ....Tucson

SOPHOMORES.

Barthels, Fred	San Francisco, Cal.
Holbrook, Horace Rollin	San Bernardino, Cal.
Moore, Leon G	Tucson
Murphey, Robert Bivins	Tucson
Newton, Raymond Austin	Patchogue, N. Y.
Page, Alphonse Clyde	Tucson
Walker, Leland Ross	St. Louis, Mo.

FRESHMAN CLASS.

Bradstreet, Carroll Pitkin	New York City
Buehman, Albert Rex	Tucson
Cole, Rena Ann	Fort Lowell
Cook, Lillian E	Clinton, Ohio
Dinsmore, Benjamin Scott	Parnassus, Pa.
Drew, William Franklin,	Mesa City
Edwards, Vance Phillips	San Francisco, Cal.
Harwick, Ralph N	Buffalo, N. Y.
Hatcher, Burrell R.	Douglas
Johnson, Joel Elmer	Mesa City
Jones, Ralph Bartlett	Anaheim, Cal.
Kuster, Andrew Sherman,	East Aurora, N. Y.
La Barree, Grace Ysabel	Tucson
Mellgren, Walter Give	Tombstone
Minus, Clarence Amos,	Douglas
Pew, William James	Mesa City
Roberts, Dorothy,	Hartford, Conn.
Rodgers, Pauline	Tucson
Ruthrauff, John Mosheim	Tucson
Thompson, Arthur Perry	Phoenix
White, Edward Willard	Tucson

Wilkerson, Mabel,	Yuma
Wooddell, Charles Edward	Tucson

UNCLASSIFIED—COLLEGE.

Barrett, Vanette—History	Tucson
Bohnstadt, Jack—English, Economics	Indianapolis, Ind.
Geddes, Robert—Spanish	Tucson
Goodin, Frances Earl—History	Tucson
Hunt, Effie Stewart	Tucson
Jernegan, Theresa Tromp—English	Wishawaka, Ind.
Kinman, E. M. –Metallurgy	Denver, Col.
Doan, Fletcher M.—Assaying, English	Tucson
Plummer, Wallace Vincent—Spanish	Boston, Mass.
Rodgers, Annie E.—History	Tucson
Shattuck, Herbert Parker—Spanish	Tucson
Spitler, Maud Dillon—Languages	Dayton, Ohio
Thompson, Imogene—English	Tucson
Wilcox, Emma Kester—English, Spanish, History,	Tucson
Williams, La Rue Hudson, Spanish	Tucson

FOURTH PREPARATORY.

Angius, Dan	Bisbee
Brown, Charles Owen	Tucson
Brown, Clara Agnes	Tucson
Brown, John Stephenson	Tucson
Calloway, Lawrence Arthur,	Phoenix
Culley, Edith Emily	Tucson
Grossetta, Warren Arthur	Tucson
Hazzard, Lynn Franklin	Bisbee
Hoyt, Joseph Clyde	Jerome
Jones, Raymond William	Topeka, Kan.

Kohler, George William	Tucson
Leslie, Beppie Lee	Tucson
MacDonald, Donald	Tucson
Martin, Andrew Philip	Tucson
O'Connell, Thomas Sarsfield,	Tucson
Post, Anita Calneh	Yuma
Reed, Sheldon Allanson,	Tucson
Samuels, Alice Huntington	Tucson
Steinfeld, Harold Donau	Tucson
Wren, Ina May,	Bisbee

THIRD PREPARATORY.

Angius, John	Bisbee
Bates, Columbus Earl	Batesville, Texas
Carroll, Henry Harris	Memphis, Tenn.
Cassiday, Clifford Harry	Tucson
Cheyney, Mary Neal	Tucson
Conwell, Albert Lee	Douglas
Cook, Clifford Morton	Clinton, Ia.
Drachman, Myrtle Augustine	Tucson
Duffy, Mary Margaret	Tucson
Goldtree, Estella Esther	Tucson
Gregory, Minnie Hortense	Tucson
Gungl, Edward Joseph	Fort Huachuca
Haas, Olive	Tucson
Lully, Alex Gray	Nogales
McClosky, Pearl Louise	Tucson
Montijo, Manuel, Jr.	Tucson
Millar, Leslie Creighton	Tucson
Murphey, Elizabeth Ella	Tucson
Nutt, Anne	San Diego, Cal.
Purcell, Ivy Mae	Tucson

Rose, Francis Winfred	Young
Ryder, Frank	Tucson
Scholefield, Helen Mar	Tucson
Sine, Eva Jessie	Tucson
Strong, Leon Henri	Tucson
Trippel, Alfred Alexander	Tucson

SECOND PREPARATORY.

Adams, David Lee	Dragoon
Attix, Mary Starr	Tucson
Batte, Homer Benjamin	Tucson
Beck, Charlotte Ellen	Tucson
Bell, Sylvester D	Tucson
Bennie, Florence Mary	Clifton
Bohannon, Mary Selene	Tucson
Brown, Earl George	Tucson
Brown, Marguerita Bernice	Tucson
Brown, Kenneth Brooke	Tucson
Brown, Rollin	Tucson
Button, Charles Aca	Williams
Cassiday, Robert Maxwell	Tucson
Clayshulte, Julia Cole	Tucson
Coles, Henry Oliver	Bisbee
Corda, Mary Wilhelmina	Olive Camp
Culin, John Harding	Tucson
Dannemiller, Charles Raymond	McCabe
Donnelly, Albert Francis	Tucson
Duffy, Alice E. Elizabeth	Tucson
Duffy, Harriet Loretta	Tucson
Estill, Howard Wilmot	Tucson
Firth, Charles Abraham,	Aravaipa
Fryer, Joseph Kent	Tucson

Gleason, Dale	Quartzite
Guerry, Horace Dixon	Tucson
Guerry, Marquis Lafayette	Tucson
Hawke, William Allen	Tucson
Heney, Ruth Esther	Tucson
Huddleston, Julian	Tucson
Huss, William R	Yuma
Judd, Bessie	Tucson
Kohler, Barbara Hess	Tucson
Long, Robert Kistner	Tucson
McClure, John Clarenden	Tucson
Mashbir, Sidney Freudenthal	Safford
McNeil, Clara May	Tucson
McNealy, Mabel	Tucson
Nielsen, Hilda Dagmar	Tucson
Nielson, Gwynne Eleanor,	Tucson
Potter, Delbert D	Clifton
Purcell, Maria Ella	Tucson
Pusch, Henrietta Louisa	Tucson
Millar, Edward B.	Tucson
Robbins, Dell	Tucson
Rose, Norman Allen	Young
Sine, Janet Volume	Tucson
Skinner, Ida Belle	Tucson
Smith, Felicia Grace	Clifton
Thompson, Lucille	Tucson
Thompson, Lilian Virginia	Tucson
Trippel, Amy Irene	Tucson
Wheeler, Charles A	Tucson
Wooddell, Florence Ella	Tucson

FIRST PREPARATORY

Adams, George Cleve	Tucson
Allison, Josephine	Tucson
Barker, Lawrence Ward	Tucson
Campbell, William Riggs	Tucson
Cannon, Frank Mullen	Congress
Christie, Gerald Franklin	Tucson
Clark, Benjamin Harrison,	Benson
Clark, Mary Ellen	Tucson
Dorn, Ella Pauline	Tucson
Estabrook, Florence Edith	Tucson
Goldring, Abraham	Tucson
Gonzales, Lottie Helen	Tucson
Hamilton, Loiseles	Tucson
Hardiker, Fred Earl	Douglas
Hawke, Viola May	Tucson
Heney, Benjamin	Tucson
Henry, Lena Beatrice	Tucson
Henry, James Malcolm	Tucson
Hoff, Florence Lydia	Tucson
Hosmer, William Ernest	Cananea, Mex.
Huddy, Viola Edith	Pearce
Jones, Sidney Raymond,	Clifton
Knestric, Emma Frances	Tucson
Larimer, Florence Howard,	Tucson
Mason, George Kemper,	Jerome Junction
Menager, Mamie	Tucson
Morales, Teresa	Tucson
Mobley, Janet Edith	Tucson
O'Connell, Mildred L.	Tucson
Orfila, Peter Antonio	Tucson
Pritchard, Estalla M.	Tucson

Pusch, Wilhelmina............................Tucson
Robles, Maria Joaquina.......................Tucson
Rodgers, Helen...............................Tucson
Roletti, Charles, Jr.........................Tucson
Shaw, Harry Downing..........................Tucson
Simpson, Jennie Bell,........................Tucson
Smith, Charlotte Bell,.......................Clifton
Sydnor, Arthur Edward,.......................Globe
Taylor, George A.............................Safford
Wakefield, William Edward....................Tucson
Williams, Isaac Jackman......................Martinez
Wooddell, Leslie.............................Tucson
Wooden, Oliver Newton,..............Dennison, Texas

UNCLASSIFIED—PREPARATORY.

Bell, Helen Margaret—Spanish, Bookkeeping.....Tucson
Carpena, Guillermo—English, Manual Training, Nogales
Castanedo, Aurelio—English, Manual Training.............Cananea, Mexico
Cole, Carl Henry—Algebra, English, Chemistry, Globe
Davidson, William Simpson—Mathematics, Economics.............Joliet, Ill.
Frances, Mary Agnes—English, Stenography, German.............Tucson
Hadsell, Idora Pearl—English, Stenography,.....Buckeye
Kresse, Arnold Carl—Chemistry.................Tombstone
Lord, Alexander—English, Manual Training, Moctezuma, Mexico
Lord, Santiago—English, Manual Training, Moctezuma, Mexico
McClosky, Albert Charles—Stenography, English, Tucson
Moore, Charles—English, Manual Training, Moctezuma, Mexico

Pease, Ione Gertrude—English, Spanish, ... Tucson
Pates, Willie Washington—Latin, English, Albany, Tenn.
Salazar, José Urbano—English, Manual Training, ... Chihuahua, Mexico
Sporleder, Louise—History .... Tucson
Torres, Miguel—English .... City of Mexico
Ulloa, Eva—English, Domestic Science, Cananea, Mexico
Wright William Edward—Latin .... Tucson

SUMMARY

Graduate Students	4		
Seniors	8		
Juniors	6		
Sophomores	7		
Freshmen	22		
Unclassified, College	16		
Total College		63	
Fourth Sub-Collegiate	20		
Third Sub-Collegiate	26		
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A71H

UNIV. OF MICH.
JUL 10 1907

REGISTER

OF THE

UNIVERSITY OF ARIZONA

SIXTEENTH YEAR
1906-1907

ANNOUNCEMENTS
1907-1908

Tucson, Arizona
1907

REGISTER

OF THE

UNIVERSITY OF ARIZONA

SIXTEENTH YEAR
1906-1907

ANNOUNCEMENTS
1907-1908

TUCSON, ARIZONA
F. E. A. KIMBALL, Printer
1907

CALENDAR.

1907.

Sept. 12, Thursday	Entrance Examinations.
Sept. 13, Friday	
Sept. 16, Monday	Registration Day.
Sept. 17, Tuesday	First Semester begins.
Nov. 27, Wednesday	Thanksgiving recess begins
Dec. 2, Monday	Instruction resumed.
Dec. 21, Saturday	Holiday recess begins.

1908.

Jan. 6, Monday	Instruction resumed.
Jan. 31, Friday	First Semester ends.
Feb. 3, Monday	Second Semester begins.
May 31, Sunday	Baccalaureate Discourse.
June 1, Monday	Exhibition Military Dept.
June 2, Tuesday	Exhibition Mechanic Arts Department.
June 3, Wednesday	Commencement.

BOARD OF REGENTS.

Ex-Officio

HON. JOSEPH H. KIBBEY .... Phoenix

Governor of the Territory.

HON. R. L. LONG .... Phoenix

Superintendent of Public Instruction.

Appointed by the Governor.

MERRILL P. FREEMAN, *Chancellor* .... Tucson

GEORGE J. ROSKRUGE, *Secretary* .... Tucson

CHARLES H. BAYLESS, A. M., *Treasurer* ...... Tucson

A. V. GROSSETTA .... Tucson

FACULTY.

KENDRIC CHARLES BABCOCK, Ph. D.
B. L., 1889, Minnesota; A. M., 1895, Harvard; Ph. D., 1896, Harvard.
President; Professor of History. 1903.*

WILLIAM PHIPPS BLAKE, A. M.
Ph. B., 1852, Yale; A. M., Dartmouth; D. Sc., Pennsylvania.
Professor of Geology, Emeritus. 1895.

ROBERT HUMPHREY FORBES, M. S.
B. S., 1892, M. S., 1895, University of Illinois.
Director and Chemist Agricultural Experiment Station. 1894.

FRANK NELSON GUILD, M. S.
B. S., 1894, M. S., 1903, Vermont.
Professor of Chemistry and Mineralogy. 1897.

DAVID HULL HOLMES, B. S.
1892-1894, Washington University; B. S. as of 1901, Arizona.
Professor of Mechanic Arts and Drawing. 1898.

GEORGE EDSON PHILIP SMITH, C. E.
B. S., 1897; C. E., 1899, Vermont.
Irrigation Engineer. 1900.

JOHN JAMES THORNBER, A. M.
B. S., South Dakota[Agricultural]; B.S., 1897, A. M., 1901, Nebraska.
Professor of Biology; Botanist, Agrcultural Experiment Station. 1901.

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*Dates following titles indicate appointment to service in the University.

IVAN DeLASHMUTT, B. S.
B. S., 1901, California.
Professor of Metallurgy. 1904.

VINTON A. CLARK, B. S.
B. S., 1898, Vermont.
Professor of Agriculture and Horticulture, Agricultural Experiment Station.* [Residence, Phœnix.] 1904.

SAMUEL VICTOR McCLURE
First Lieutenant, U. S. A., 1896, West Point.
Professor of Military Science and Tactics. 1904.

EDWIN MORTIMER BLAKE, Ph. D.
Engineer of Mines, 1890; Ph. D., 1893, Columbia.
Professor of Mathematics and Mechanics. 1904.

SIDNEY CARLETON NEWSOM, A. M.
A. B., 1895, Harvard; A. M., 1898, Chicago.
Professor of English. 1904.

CYRUS FISHER TOLMAN, Jr., B. S.
B. S., 1896, Chicago.
Professor of Geology. 1905.

GAVIN N. HOUSTON, C. E.
C. E., 1893, Princeton.
Professor of Civil Engineering.† 1906.

ALBERT EARLE VINSON, Ph. D.
B. S., 1901, Ohio [State]; Ph. D., 1905, Goettingen.
Associate Chemist, Agricultural Experiment Station. 1905.

CHARLES ALFRED TURRELL, A. M.
B. S., 1896, Nebraska; A. M., 1901, Missouri.
Assistant Professor of Modern Languages. 1904.

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*Resigned May 1, 1907.

†Resigned April 1, 1907.

WILLIAM WHEELER HENLEY, A. B.
A. B., 1905, Leland Stanford, Jr.
Assistant Professor of Mechanic Arts. 1905.

FREDERICK W. WILSON, B. S.
B. S., 1905, Kansas [Agricultural].
Assistant Professor of Animal Husbandry. 1905.

WILLIAM GEORGE MEDCRAFT, A. M.
A. B., 1898; A. M., 1904, Kansas Wesleyan.
Assistant Professor of Mathematics. 1906.

ANDREW ELLICOTT DOUGLASS, A. B.
A. B., 1889, Trinity.
Assistant Professor of Physics and Geography. 1906.

WILLIAM BURNETT McCALLUM, Ph. D.
B. S. A., 1894, Toronto: Ph. D., 1904, Chicago.
Associate Professor of Vegetable Physiology and Pathology. 1907. (January).

MARION CUMMINGS STANLEY, B. L.
B. L., 1900, California.
Instructor in Philosophy. 1902.

ESTELLE G. LUTRELL, A. B.
A. B., 1896, Chicago.
Instructor in English; Librarian. 1904.

FREDERICK EDWIN TALMAGE, B. S.
B. S., 1903, California.
Instructor in Stenography and Book-keeping. 1904.

LEONA PAYNE NEWSOM, Ph. D.
A. B., 1892; Ph. D., 1895, Franklin.
Instructor in Latin. 1905.

A. MAY ASHWORTH, A. B.
A. B., 1901, Smith.
Instructor in English. 1905.

VICTOR LIGDA, B. S.
B. S., 1904, California.
Instructor in Physical Training and French. 1906.

OPAL I. TILLMAN, B. S.
B. S., 1905; M. S., 1906, Ohio State.
Instructor in Domestic Science and Botany. 1906.

IDA CHRISTINA REID, Ph. B.
Ph. B., 1906, Arizona.
Instructor in History and Mathematics. 1906.

C. G. HOOVER.
Rochester College (Indiana).
Instructor in Music.

RAYMOND C. BENNER, M. S.
B. S., 1902, Minnesota; M. S., 190-, Wisconsin,
Instructor in Chemistry. 1906.

EDWARD E. FREE, B. S.
B. S., 190-, Cornell.
Assistant Chemist, Agricultural Experiment Station. 1906.

FREDERICK EDWIN TALMAGE, B. S.
Secretary of the University. 1904.

HERBERT BROWN
Curator Territorial Museum.

MRS. CORNELIA M. STEWART
Preceptress of Young Women. 1903.

MRS. MARY HENRY AITON, M. D.
M. D. Northwestern.
Medical Examiner for Women. 1905.

ARTHUR W. OLCOTT, M. D.
A. B., 1884, Princeton; M. D., 1887, St. Louis.
Medical Examiner for Men. 1905.

WILLIAM GEORGE MEDCRAFT, A. M.
Head of Men's Dormitory. 1905.

JAMES S. CASSELMAN
Secretary to the Director of the Agricultural Experiment Station. 1906.

S. P. GREENLEAF
Superintendent of Buildings and Machinery. 1907.

IVAN DeLASHMUTT, B. S.
Commercial Assayer. 1906.

STUDENT ASSISTANTS.

[Service not continuous through the year in every case.]

Rollin H. Holbrook
Burrell A. Hatcher
Walter Mellgren
Frederick Barthels
Raymond A. Newton
Theodore Chapin
Vance P. Edwards
Frances M. Babcock
Mabel Wilkerson
William F. Drew
George W. Kohler
A. Perry Thompson
Lawrence A. Calloway
J. Clyde Holt
Joseph L. Gould
Willard H. Nash
John J. Engle
Edwin White
H. Oliver Coles
Guy Emmons
Frank Cannon
G. Kemper Mason
Norman A. Rose
Charles A. Firth

STANDING COMMITTEES.

1906-1907.

The President is ex-officio member of all committees.

Executive.

Professors Forbes, Holmes, E. M. Blake.

Registration and Classification.

Professors Guild, E. M. Blake, Newsom, Medcraft.

Library.

Professors Guild, Smith, Turrell, Miss Lutrell.

Printing and Publication.

Professors Forbes, Newsom, Mr. Talmage.

Athletics.

Professors Thornber, Houston, Mr. Ligda.

Public Exercises.

Professors E. M. Blake, Holmes, Mrs. Stanley.

Intercollegiate Debate.

Professors Thornber, Newsom.

Manual Training.

Professors Holmes, Smith, E. M. Blake.

Co-Operative Association.

Mr. Talmage.

Sub-Collegiate Department.

Professors Newsom, Medcraft, Miss Ashworth, Miss Reid.

Rhodes Scholarship.

President Babcock, Professors Newsom, Guild.

UNIVERSITY OF ARIZONA.

Established by Act of the Legislative Assembly, 1885;
Opened to Students, October, 1891.

PURPOSE AND ORGANIZATION.

The University of Arizona is a part of the system of public education established for the Territory, and aims, as head of such system, to fill the same position as that occupied in the States by the State Universities. In general, the organization of the University is in accordance with the Morrill Act of 1862, creating the Land Grant Colleges. The United States has already set apart fifty-seven sections of valuable public land in the northern timber belt, to which the University will receive full title upon the admission of the Territory into the Union. In creating the University, the Legislative Assembly wisely unified under one management the various schools and institutions of higher learning or investigation, which in some States and Territories have been widely and completed separated—the colleges of liberal culture, the schools of Mines and Engineering, the Agricultural College, and the Agricultural Experiment Station. No professional school of law, medicine, or arts has yet been organized. On the other hand, while the high schools of the Territory are in the formative period, the desire to make the University serviceable to all has led to the establishment and maintenance of a sub-collegiate department.

The purpose of the University of Arizona is, in the language of the organic law, "to provide the inhabitants of this Territory with the means of acquiring a thorough knowledge of the various branches of literature, science and the arts;" and so far as possible a technical education adapted to the development of the peculiar resources of Arizona. In furtherance of this latter purpose, instruction is provided especially in subjects fundamental to agriculture, the mechanic arts, mining, and metallurgy. The University, by the nature of its situation, frankly lays its strongest emphasis upon the course in mining engineering. It is, in reality, in a great mining laboratory, surrounded as it is on all sides by great mines. Some of these mines developed on a large scale are within a few miles of the city and the number and magnitude of such enterprises are steadily increasing. Probably no University in the United States offers such fine advantages to the students of mining engineering who desire to see the actual operation of great mines, or the development of great enterprises, while carrying on the theoretical and experimental work of the mining course. The advantages in civil engineering are hardly less noteworthy, for Tucson is not only a division point on the main line of the Southern Pacific Railroad, with large shops and roundhouses, but it has the administrative and engineering headquarters for five of the subsidiary or allied lines of the Southern Pacific system in Arizona anc in Sonora, Mexico, commonly known as the Randolph lines. All these lines are undergoing extensive expansion and rebuilding, and so furnish excellent opportunities for observation and vacation employment for students of civil engineering.

The Agricultural Experiment Station, a department of the University, is engaged wholly in investigating and developing the agricultural resources of the Territory.

The government of the University is vested in a corporation styled The Board of Regents of the University of Arizona, consisting of the Governor of the Territory and the Superintendent of Public Instruction, ex-officio, and four other members appointed by the Governor.

LOCATION AND CLIMATE.

The University of Arizona is located at Tucson, a city of twelve thousand inhabitants, on the main line of the Southern Pacific railway, 312 miles west of El Paso, Texas, and 500 miles east of Los Angeles, Cal. The city lies in a broad, flat valley at an elevation of 2,400 feet above sea level and is surrounded by mountains. Its dry, mild, and equable climate has made Tucson a famous winter resort unsurpassed for healthfulness.

The winter climate is especially good; the temperature is cool and strengthening but not severe, the lowest temperature recorded during the average year being about twenty degrees above zero, Fahrenheit. Little rain falls during the winter; fogs are all but unknown; cloudy days are rare. The percentage of sunshine throughout the winter is greater than that recorded at any other place in the United States. Owing to the extreme dryness of the air the highest temperatures known are less oppressive to the senses and less dangerous to the health than the summer heats of the upper Mississippi Valley States. The total amount of rainfall averages less than twelve inches.

The University Campus, consisting of fifty-five acres, is situated upon high ground about a mile from the business center of the city with which it is connected by an excellent electric street-car line. On every side it commands a view of mountain scenery of remarkable extent and grandeur. The buildings are lighted by electricity furnished by the city plant.

An abundant supply of unusually good water for household, laboratory and irrigation purposes is drawn from a large well on the Campus from a depth of one hundred and twenty feet.

The grounds have been carefully laid out in drives, lawns and gardens. A large number of palm, olive, umbrella, ash, pepper, bagota and cottonwood trees give the Campus quite the air of a well kept park.

BUILDINGS.

The main building, University Hall, is 200x150 feet, two stories in height; the first story of gray stone, the second of red brick. It is completely surrounded by a wide two-story veranda. The building contains recitation rooms, laboratories and apparatus rooms of various departments, an assembly room, and the office, laboratories and library of the Agricultural Experiment Station.

The Library and Museum building, costing about $32,000, including furnishings, was occupied in January, 1905. It is a handsome red brick and Bedford sandstone building, with a massive tile roof. The interior finish is in natural oak and pine. The offices of the President and Secretary of the University, three lecture rooms for the departments of geology, mathematics, English and history, work rooms for the library and museum, and a laboratory for the department of geology are on the first floor. The Library reading room is on the second floor;

a large, well-lighted room, beautifully furnished with heavy solid oak reading tables, desks and wall cases. The stack-room at the rear is fitted up with the most modern steel stacks. The Museum occupies part of the first floor and the west half of the second floor. Fine oak and plate glass cases constitute the furnishings.

North Hall, a dormitory two stories in height, built of gray stone of fine quality, is occupied by the college men. Besides the parlor and rooms of the instructor in charge, it contains seventeen rooms, each large enough to accommodate two students. During the summer of 1906 the building was remodeled, in part by the addition of a shower bath and toilet rooms.

South Hall, a large brick building containing forty rooms, besides bath and toilet rooms and store rooms, is the dormitory mainly for preparatory students. It will accommodate seventy-five students.

West College is now used as a dormitory for young women. It is a two story brick house with wide porches, surrounded with vines, shrubbery, lawns and trees.

The Dining Hall, built of red brick, provides ample boarding accommodations for all persons living on the campus.

The Shop and Assay building is a large, substantial brick structure. It contains a commodious drawing room for mechanical and free-hand drawing, a large laboratory for forge work, machine practice and carpentry, and a laboratory, instrument room and lecture room for the department of civil engineering. Two other rooms are used for lockers, and for the motor and engine. The commercial assaying department occupies a number of rooms fully equipped with a large melting furnace, the necessary muffle furnaces, and other accessories for making complete and accurate assays.

The Mill or Mining Machinery building, located to the northeast of the main group of buildings, is a plain wooden structure in which are placed the stamp-mills, jigs, concentrating tables, separators, etc., necessary for the mining laboratory.

Herring Hall, the Gymnasium, is a very substantial high building, 40x80 feet, constructed of red brick and white plaster. It was erected in 1903, the gift of Professor James Douglas and his associates of the Copper Queen Consolidated Mining Company, through Colonel William Herring, after whom it was named.

The Pump house and mechanical engineering laboratory was built during the summer of 1905 with funds appropriated by the legislative assembly. By the use of brick, cement and iron it is practically fire proof, thus insuring safety to the well and pumps supplying the University with water for all its uses.

Two two-story brick residences are occupied by the President of the University and by the Director of the Agricultural Experiment Station.

Other buildings are the cottage occupied by the department of domestic science, three greenhouses, a brick barn, and various smaller out-buildings used for shops and store rooms.

MAINTENANCE.

The University is supported by funds supplied by the United States Government and the Territory of Arizona. By the provisions of the Morrill Act of 1890, the

University receives annually from the United States the sum of $25,000 for the College of Agriculture and Mechanic Arts, established in accordance with the Act of July 2, 1862. Beginning with July 1, 1907, this fund will be increased by $5,000, in accordance with the Act of 1907. For the support of the Agricultural Experiment Station the University receives from the same source an annual appropriation of $15,000 by the Act of Congress of 1887, known as the Hatch Act; and $7,000 (for 1907-8, $9,000) by the Adams Act of 1906. The Territory of Arizona provides, for 1906-7, the proceeds of a 3-5 mill tax on the assessed valuation of property of the Territory, which in 1906 amounted in round numbers to $30,000. Besides these sums, the University receives from year to year, by special grants of the Territorial Legislative Assembly, appropriations for specific purpurposes. $20,000 dollars was thus voted for the years 1905 and 1906, to be devoted to minor buildings, improvements, repairs, publications, etc. In 1907, $5,600 was appropriated for the benefit of the work of the Agricultural Experiment Station, and $40,000 (one-half available in January, 1908, the balance in January, 1909) towards a building for the departments of chemistry, mineralogy, physics, biology and astronomy. It is expected that construction of this science hall will begin about November, 1907.

EQUIPMENT.

LIBRARY.

The library, containing 11,000 bound volumes and 12,000 pamphlets, is open to the use of all students. Of these volumes a collection of complete sets of scientific and literary periodicals, to which additions are being made yearly, is of special service in reference work.

The books are classed by the decimal system and shelved in numeric order with a further author division according to the Cutter numbers. The catalogue is the usual dictionary card catalogue of authors, subjects and titles in one alphabetical arrangement. Library of Congress cards are used whenever obtainable. The Reading Room is supplied with books of general reference which may be consulted by the students without any formality. The following current periodicals and newspapers are on file for the use of students and general readers in the Reading Room:

Periodical List.

*Advocate of Peace,
American Architect and Building News,
American Blacksmith,
American Chemical Journal
American Chemical Society, Journal,
American Historical Review
American Institute of Mining Engineers, Transactions,
American Journal of Pharmacy,
American Journal of Science,
American Journal of Sociology,
American Machinist,
American Mathematical Society, Bulletin,
American Mathematical Society, Transactions,
American Naturalist,
Arena,
*Arizona Mining Review,
Association of Engineering Societies, Journal,
Athenaeum,
Atlantic Monthly,
Biedermann's Zentralblatt fur Agrikulturchemie,
Bookman,
Botanical Gazette,
Botanisches Centralblatt,

*Donated.

*California Cultivator,
Canadian Entomologist,
Cassier's Magazine,
Cement,
Century,
Chemical News,
Chemical Society, Journal, (London)
Chemisches Centralblatt,
Collier's Weekly,
Cumulative Book Index,
Delineator,
Deutsche Chemische Gesellschaft, Berichte,
Dial,
Economic Geology
*Educational Gazette,
Educational Review,
Electrical Review,
Electrical World,
Electrochemical and Metallurgical Industry,
Engineering and Mining Journal,
Engineering Magazine,
Engineering News,
Engineering Record,
Espana Moderna, La,
Everyday Housekeeping,
*Farmer's Voice,
Fern Bulletin,
Forestry and Irrigation,
Forum,
Franklin Institute, Journal,
Geological Magazine,
Geological Society of America, Bulletin,
Geologisches Centralblatt,
Graphic, (London)
Harper's Monthly Magazine,
Harper's Weekly,
International Studio,
Irrigation Age,
Journal of Geography,
Journal of Geology,
Journal of Political Economy
Ladies' Home Journal,
Literarisches Zentralblatt,
Literary Digest,
Living Age,
*Lowell Observatory, Bulletin,
McClure's Magazine,
Manual Training Magazine,
Mines and Minerals,
Mining and Scientific Press,
*Mining Reporter,
*Mining Review,
*Mining World,
Nation,
Nineteenth Century and After,
North American Review,
*Our Dumb Animals,

*Donated.

Our Times,
Out West,
Outing,
Outlook,
Plant World,
Poet-lore.
Popular Science Monthly,
*Prairie Farmer,
Public Libraries,
Publishers' Weekly,
Reader's Guide to Periodical Literature,
Review of Reviews,
School of Mines Quarterly,
School Review,
Science,
Scientific American,
Scientific American, Supplement,
Society of Chemical Industry, Journal,
Scribner's Magazine,
Societe Francaise de Mineralogie, Bulletin,
Society of Civil Engineers, Transactions,
Torrey Botanical Club, Bulletin,
World's Work.

NEWSPAPERS ON FILE IN THE READING ROOM.

*Arizona Blade,
*Arizona Bulletin,
Arizona Daily Star,
*Arizona Gazette,
Arizona Range News,
*Arizona Silver Belt,
Arizona Weekly Journal Miner,
Coconino Sun,
Bisbee Review,
*Graham County Guardian,
Los Angeles Times,
Mojave County Miner,
*Oasis,
Prescott Weekly Courier,
Southwestern Stockman,
*Tempe News,
Tucson Citizen,
Tucson Post,
Tombstone Epitaph,
Weekly Republican.

The Carnegie Library of the city of Tucson is also open to the use of the students of the University. This

*Donated.

library is the depository of United States Government documents for the Territory of Arizona.

MUSEUM.

The Seventeenth Legislative Assembly of Arizona established a general museum at the University, to promote the collection of materials of all kinds illustrating the resources and development of Arizona, and particularly to preserve historical relics, including those pertaining to the aboriginal inhabitants. Donations of specimens and collections will be received and acknowledged with thanks, but no special provision has yet been made by the Legislature for the support of this department, aside from a small appropriation for the salary of a curator.

The professors of the University have the immediate care of the collections pertaining to their respective departments. The collections now displayed at the University comprise representative series of minerals, ores and rocks of Arizona. Among these may be particularly mentioned superb specimens from the mines of the Copper Queen at Bisbee. There are also collections of typical rocks and minerals for comparison, and many specimens of ores from different parts of the United States and from abroad. It is desired to make the collection of ores and minerals fully represent the great mineral resources of Arizona.

A large amount has been recently spent upon new cases for the Museum in its new quarters, and the material thus re-arranged and displayed in good light becomes doubly attractive and useful.

The Museum is indebted to Mr. Herbert Brown, curator, for a large and valuable collection of skins of the birds of Arizona, which he has deposited in the Museum, as well as for a collection of ancient aboriginal pottery and other relics. The fossil skull and teeth of an elephant and other fragmentary remains of extinct animals sent from Yuma by Mr. Brown deserve special mention.

Historical records of much value are gradually accumulating as a part of this Museum, and an appeal is made to old settlers and others to bear this fact in mind when making disposition of articles bearing even remote relation to the early pioneers of their history. All records and data of any nature that can be gleaned are worthy of preservation, and it is earnestly desired to have them placed at the University, where they will always be accessible for reference.

BIOLOGY.

The biological laboratories are located on the second floor of University Hall. They are convenient and well-lighted. and the equipment is such as is required for modern instruction and research in the biological sciences. The library and apparatus are well selected and adapted to the region and the courses offered.

The collections possessed by this department form a very important part of its equipment. The herbarium consists of 12,000 sheets of mounted plants, of which number 2,500 are included in the University botanical survey herbarium. The unique flora and fauna of the mountain, mesa and lowland collecting grounds, in close proximity to the institution, offer very attractive opportunities for instruction and research especially along ecological lines. The Desert Botanical Laboratory of the Carnegie Institution supplements in most admirable fashion the facilities of the University for investigation.

In addition to the above there are fifty cases of insects, a large case of seeds, articulate and disarticulate human skeletons, plaster and papier-mache models of the important structures of the human anatomy, and duplicate material for study and dissection.

CHEMISTRY.

The chemical laboratories used for instruction are two in number. That used by beginners in the study of general chemistry and qualitative analysis is on the second floor of University Hall, and is equipped for the experimental and theoretical study of chemical science.

The laboratory for quantitative analysis is on the first floor of University Hall. It is thoroughly equipped for the teaching of volumetric and gasometric analysis, blow-pipe analysis, metallurgical chemistry, and wet and fire assaying, including apparatus for the electrolytic determination of metals.

The balance room contains analytical and bulllion balances of the latest model so arranged as to insure a maximum of stability and accuracy. A lecture and demonstration room fitted with sinks, cabinets, etc., completes an equipment of apparatus and collections adequate for first-class instruction in both theoretical and practical chemistry.

The laboratories of the Agricultural Experiment Station occupy three rooms on the first floor. These are devoted to analytical work and chemical investigations relating to agriculture. Though not intended for the use of students they are of incidental value to the instructors and students through the investigations which are here conducted.

MINERALOGY AND PETROGRAPHY.

The laboratory for quantitative analysis is used for determinative mineralogy and blow-pipe analysis. The laboratory is supplied with necessary apparatus for student work, including glass and wooden models for the study of crystallography, hand and reflecting goniometers for the measurement of the angles of crystals, a polariscope for the study of optical properties of minerals, and a type set of 600 minerals.

For the study of petrography the laboratory is supplied with a type set of rocks classified according to Rosenbusch's Elemente der Gesteinlehre with thin sections corresponding, four petrograpic microscopes, a collection of oriented sections of minerals and apparatus for studying interference phenomena.

PHYSICS.

Three rooms on the first floor of University Hall are set apart for the teaching of physics. The facilities for experimental demonstration of all important phenomena are very complete. The lecture room is fitted with shutters so that it can be darkened. A beam of sunlight directed by a fine clock heliostat outside may be thrown steadily across the lecture table for experiments on light, or used in connection with the solar lantern for a variety of other work. Adjacent to the lecture room are the laboratories and the apparatus room. Both lecture room and laboratories are supplied with water and gas.

An eight-inch Willyoung induction coil with storage and X-ray accessories is used in the study of high-tension electricity. Through the generosity of the Honorable Mark J. Egan, of Clifton, the University added to its equipment for the study of electricity a fine imported set of miniature wireless telegraphy apparatus, capable of transmitting messages about two hundred feet.

This department also has a double dissolving arc-light Ideal stereopticon, which is used by various other departments of the University and for public lectures before the students.

MATHEMATICS.

Models are an important aid to the study of mathematics. The collection of the department includes thread models of about forty ruled surfaces of the third, fourth and sixth orders. These illustrate the theory of surfaces and are also valuable in the study of kinematics and linkages.

The Bulletin and Transactions of the American Mathematical Society, and the Encyklopedia der Mathematischen Wissenschaften are subscribed for by the University Library.

MINING ENGINEERING AND METALLURGY.

The Mill, or mining engineering and metallurgical laboratory is equipped for use by the students of metallurgy in connection with their work in testing ores as to their adaptability for treatment by different processes both on a large and small scale.

The chief features of the equipment are: A Blake crusher, 4 in by 7 in.; a Dodge crusher, 4 in. by 5 in.;

sampling rolls, 6 in. by 9 in.; a cone and burr sample grinder; a pebble mill with a capacity of about 15 lbs. at one charge; a laboratory Lightning crusher and a disc pulverizer. A 5-stamp mill, with 800 lb. stamps; a 3-stamp mill, with 250 lb. stamps; inside and outside amalgamated plates for the same; a 2 ft. clean-up pan; a 1 ft. amalgamation pan, and a 9 jar revolving agitator for testing samples of a few ounces; a No. 5 Wilfley table of the latest pattern, and a Hallett hand jig; a 1½ ton cyanide plant for treating sands or dry crushed ore; two 150 lb. cyanide plants for treating smaller samples; a 3 ft. agitator; a 12 in., 6-chamber, flush plate and frame, washing filter press and pump for the same; a Sturtevant shaking screen; a Tullock ore feeder, a belt and bucket elevator, sampling plates, split samplers, a shaking screen, percolators, sizing screens from 1-mesh to 200-mesh, miner's pans, bateas, retorts, etc.

The power for operating this plant is furnished by a 30 h. p. Westinghouse induction motor, type C.

The assay laboratory is equipped with assay furnaces for crucible work, for scorifying and cupeling, and for retorting mercury from amalgam, besides all needed appliances for assaying by dry and wet method including electrolysis. The laboratory also has desks and fittings for the chemical work required in the metallurgical and mineralogical investigation and analysis of ores, in mineral fertilizers, and in qualitative tests of minerals.

CIVIL ENGINEERING.

The apparatus in this department has been chosen with a view of giving the student the greatest familiarity with the theory, construction and use of those instruments and machines which observation has shown to be of universal adoption in practical civil engineering work and the allied lines in hydraulic and mining engineering. This apparatus embraces surveyors' and engineers' chains; standard field and pocket tapes; plain solar compasses and transits; mining transits; engineers' levels; stadia, level and transit rods; aneroid barometers; odometers, automatic water registers, hook-guages; three forms of current meter; stop watch; meteorological instruments; drafting instruments; mechanical calculators; blue-print apparatus; a four and one-fourth inch astronomical telescope with equatorial mountings and accessories; celestial sphere; planimeter; a complete set of apparatus for testing cement; and an Olsen Universal testing machine of 100,000 pounds capacity.

MECHANICAL ENGINEERING.

This department has a drafting and recitation room in addition to the regular drawing rooms of the department of Mechanic Arts. In this room is the catalogue file containing the trade literature of about five hundred leading machinery manufacturers of the United States; the collection of working drawings consisting of over three hundred blue prints, and the sample collection of models, machine parts, valves, electric fittings, insulating materials, abrasives, etc.

The Mechanical and Electrical Laboratory, which occupies a large room in the new Pump House, is equipped for the study and operation of boilers, steam and gasoline engines, hydraulic and electrical machinery. Besides the machinery of the shop and mill which can be used for experimental purposes and for study of machine design, the University has a 60 h. p. tubular boiler, 35 h. p. Atlas engine, a Duplex feed pump, a Cameron pump, a 3 h. p. and a 1-2 h. p. direct current electric motors, an injector, a 500 gallon fire pump and a 40 h. p. Fairbanks-Morse gasoline engine. A 300 gallon two-stage centrifugal pump in the University well and its electric motor serve as part of the equipment for mechanical engineering.

MECHANIC ARTS.

The Mechanic Arts building, provided largely through the generosity of the Copper Queen Consolidated Mining Cempany, has a total floor area of 7,900 square feet divided as follows: Power room and draughting room, each 1,200 squore feet; wood-working shop, forge shop and machine shop, each 1,400 square feet; wash room, 600; model room, 400, and store room 300 square feet.

The entire building is well ventilated and lighted, from above as well as from the sides. The drafting room is heated by steam.

The wood shop is equipped with a full assortment of hand tools, six turning lathes, a Universal wood-working machine, a Whitney dimension sawing machine, a band saw, a Universal trimmer and a large grindstone with truing device.

The forge room contains twenty-four down-drought forges, twenty-four anvils, a combination shear and punch, a blacksmith's drill press and a full assortment of small tools and appliances. Blast is furnished by a No. 3 Sturtevant blower; the smoke and gases are removed by a 70-inch exhaust fan.

The machine shop contains one 24-inch Lodge and Shipley engine lathe with taper attachment, two 14-inch Lodge and Shipley lathes, one 14-inch Pratt and Whitney lathe with taper attachment, one 10-inch Reed speed lathe, one 16-inch Cincinnati shaper, one 24-inch by 6-foot Woodward and Powel planer, one Brown and Sharpe No. 2 Universal milling machine, one Brown and Sharpe No. 1 Universal grinder, one 24-inch Prentice Bros. drill press, one power hack saw, one drill grinder, one emery stand and one grinding attachment for the lathes. A 1½ ton portable crane and a 1-ton triplex chain hoist are used in handling the heavier work.

Each shop has its own tool room well arranged and supplied with small tools, gauges, measuring instruments, etc.

A large wash room, containing a hundred lockers, is supplied with basins and running water.

AGRICULTURE AND HORTICULTURE.

Because of the situation of the Territorial University the educational work in agriculture and horticulture has taken peculiar form, being largely conducted on the correspondence plan, particularly through the "Timely Hints for Farmers" issued under the auspices of the Experiment Station, but of distinct educational value. Three thousand farmers of the Territory are reached more or less regularly by timely publications on subjects of vital interest. Farmers' Institutes, announcements of which are made from time to time, take the form of short courses in agriculture.

Small and well selected agricultural libraries of slight cost have been forwarded to a considerable number who have expressed a willingness to receive them.

It is believed that this method of dealing with our situation will become increasingly useful.

The equipment for agricultural instruction is good, consisting of an excellent seed collection, a green-house and gardens for experimental purposes containing many rare and interesting plants, and a well selected agricultural library.

GYMNASIUM.

Herring Hall, the new gymnasium, is fully equipped for the purposes of the department of physical training and athletics. The apparatus is of standard make, and includes forty chestweights, dumb-bells, bar-bells, wands, Indian clubs, a Medart vaulting horse, parallel-bars, a horizontal bar, a quarter-circle, an abdominal chair, wrestling machine, wrist machine, finger machine, chest expander, chest developer, climbing rope, flying rings, traveling rings, striking bag and drum, jump and vaulting stands, fencing foils and masks, basket balls and goals, five large mats and a set of anthropometric apparatus.

In the basement are located ninety-six lockers and five shower baths, which are supplied with hot water from a heater with large resorvoir.

In connection with this equipment are the base ball and foot ball field, and four fine tennis courts.

During the past year a gallery was built across the west end of the gymnasium, with a seating capacity of about one hundred and fifty, thus increasing the convenience and usefulness of this building.

MILITARY.

Room O is used as an armory. It is fitted up with the necessary gun racks and accessories. The equipment includes 150 old style Springfield rifles, 100 Krag-Jorgensen rifles with complete accoutrements, eight sabres and belts, musical instruments for the band and signal flags. A large clear area south of the Library building is kept leveled and smooth for a drill ground and parade ground. At the rear of the Mill building are the targets for short range practice.

GENERAL ORGANIZATION.

I. College of Agriculture and Mechanic Arts.

In the College are offered courses leading to the following degrees:

1. Bachelor of Philosophy.
2. Bachelor of Science.
    - b. In Civil Engineering.
    - c. In Mechanical Engineering.

II. The School of Mines.

A four-year course leading to the degrees of:

1. Bachelor of Science in Mining.
2. Bachelor of Science in Metallurgy.

The Bureau of Mines and commercial assaying.

III. The Agricultural Experiment Station.

IV. The Sub-Collegiate Department of Manual Training.

English, scientiffc and classical subjects.
Manual training and domestic science.
Bookkeeping, stenography and business practice.

COLLEGE OF AGRICULTURE AND MECHANIC ARTS.

The courses offered in the College of Agriculture and the Mechanic Arts provide both a liberal training along literary and scientific lines and technical training along engineering, mechanical and agricultural lines. Great latitude of election is given in the literary and scientific courses, but the courses in engineering are more rigid in their requirements. Full details of the various courses follow. The aim in all is to combine the practical with the theoretical in instruction. The needs of a young and growing commonwealth are kept in mind, and a steady attempt is made to develop the adaptability and resourcefulness so necessary to meet the changing conditions.

ARIZONA SCHOOL OF MINES.

The School of Mines is designed for the education and training of young men in the arts and sciences directly involved in the industries of mining and metallurgy. Especial attention is given to the sciences of mathematics, physics, chemistry, mineralogy, geology and their applications. The Bureau of Mines and Assaying, while not directly connected with the work of instruction, affords with its laboratory and the influx of new material, a valuable object lesson to the advanced students of mining and metallurgy.

REGISTRATION.

All students are expected to register on registration day at the beginning of the year and at the beginning of the second semester, in the University office or in such rooms as may be designated on that day. Before making choice of elective subjects the student should in every case confer with the instructors concerned and with the committee on registration. A matriculation fee of $5.00 is required of all students upon entering the University. No student will be considered registered until the matriculation fee has been paid. This fee is paid once and is not required for future registration. After registration no change in classes can be made without the consent of the committee on registration.

Students entering from other institutions should present to the committee certified copies of their records in such schools, together with certificates of graduation or of honorable dismissal. A copy of the school catalogue or course of study should be furnished with the credentials, in order to facilitate the work of the committee.

TUITION.

Tuition is free to students of Arizona. For all non-resident students, tuition is $10 for each semester. No reduction will be made for late registration or early withdrawal.

RECORDS.

The class standing of each student is determined by the instructor in charge. The method of ascertaining the student's record is left to the instructor, and his report in all cases is final.

DISCIPLINE.

The disciplinary policy of the University in all its departments is based upon the assumption that the students are young gentlemen and young ladies who come to the institution with a high determination to utilize to the full the opportunities offered, and with a keen sense of duty, honor and courtesy to each other and to the faculty. Formal and explicit prohibitions and rules are few, but those will be rigidly enforced, with adequate penalties, and good order and discipline maintained. The University is a civil, rather than a military community, and such privileges as will not be abused will be allowed all classes of students. In aggravated cases, such as cheating in University work, frequenting saloons, gambling houses, and other objectionable places, and serious breaches of peace or order, the faculty will not hesitate to proceed to the extreme measure of expulsion. In case of expulsion the student is required by regulations of the Regents and faculty to leave the campus immediately, and by Territorial statute to surrender his cadet uniform to the University. In all matters of discipline the faculty and President will strive for fairness, equity and efficacy rather than uniformity.

Students or classes desiring to make requests of the faculty should file their petition in the President's office before the hour of faculty meeting; class petitions must be presented at least two days before the time of meeting.

VACATIONS AND HOLIDAYS.

A short recess (see calendar, page 2) is taken at Christmas time. The long summer vacation begins about June first and continues until the middle of September. The Thanksgiving recess extends from the close of the regular exercises on the Wednesday before Thanksgiving to the next Monday morning. During the spring of the past three years the cadet companies have made a practice march of from three to seven days, which constituted in reality a third vacation for the preparatory department and for freshmen. All legal holidays are observed by the cessation of ordinary University work.

Arbor day has been formally adopted by the University Regents as the regular anniversary on which shall be celebrated the founding of the institution, in connection with the ceremonies of tree planting.

LIVING ACCOMMODATIONS.

Provision is made so far as possible for furnishing board and rooms to students of both sexes upon the University grounds. Young men have comfortable quarters in South Hall, which can accommodate about seventy-five students, two in a room, and in North Hall (for college men only), which can accommodate thirty-five students. West Cottage, the home of the young ladies, is in charge of an experienced and capable preceptress who has constant supervision of those rooming there.

All dormitories are lighted by electricity. Rooms contain a clothes press, and are provided with single bedsteads, table, chairs, mirror, wash-bowl, pitcher and slop-jar. Students will supply their own mattresses, pillows, sheets, blankets, towels, rugs and brooms, and such other articles as they may desire for ornamenting their rooms. They will care for their own rooms under the direction of the head of the dormitory. The Dining Hall of the University has accommodations for one hundred students. It is under the management of a paid steward who is responsible to the President and the Board of Regents. While the charge for board is very low, it is the aim of the management to serve substantial, wholesome, appetizing meals. All students having rooms in the dormitories are required to take their meals at the Dining Hall. Students and members of the faculty, who reside outside the dormitories, may board at the Dining Hall.

FEES AND EXPENSES.

	Lowest.	Highest.
Tuition free to students from Arizona.....		
Tuition, students non-resident in Arizona, each semester	$10.00	$10.00
Maintenance fee (deposit) by students in men's dormitory	3.00	3.00
Maintenance fee (deposit) by male students residing in town	1.00	1.00
Mininge xcursions for advanced students,	20.00	40.00
Laboratory and shop fees, varying according to courses, per annum	2.00	30.00
Military uniforms	16.25	24.00
Books, per annum	5.00	20.00
Board, per month	17.00	20.00
Lights per room, per month	.50	1.50
Napkins	.50	.50

By resolution of the Board of Regents of the University, board is to be paid in advance on the first of each month. If tickets for the Dining Hall are not purchased before the third of each month, $18.00 instead of $17.00 will be charged for the month's board. Checks and postoffice or express money orders should be made payable to the President. No reduction in the bill for board will be made for absence for a period less than one week, except by special arrangement at the office.

Text-books may be obtained directly from the publishers through a book association managed on the co-operative plan under the direction of the faculty. Members of the cadet companies will be required to provide themselves with the prescribed uniform, which will be ordered by the University. The cost of the cadet gray, woolen uniform, which must be deposited in advance, averages about $16.25. This uniform has shown better wearing qualities than a civilian suit of equal cost, and parents are urged to consider the matter of uniform when supplying their sons with clothing for the approaching University year. It may be worn on all occasions, and thus will remove the necessity for additional expenditure for outer clothing other than overcoats. When the warm weather of spring comes, the students are expected to purchase the regulation khaki uniform and campaign hat, the total expense being about $7.

The University has at present no loan funds with which to aid students who must earn their way. Various positions about the grounds, buildings and laboratories of the University, paying from $4 to $20 per month, are filled by students who must be self-supporting. The number, however, is not large, and preference is given to students from Arizona and to those who have spent time enough in the University to demonstrate that they are earnest, capable, reliable young men, likely to do this outside work and at the same time maintain a good record as students.

The Philo Sherman Bennett scholarship was constituted by the gift of $500 to the University in 1905, through the agency of Mrs. William Jennings Bryan, to be used in aiding young women to secure an education. The income will be awarded to a deserving applicant in the year 1907-8.

REQUIREMENTS FOR ADMISSION.

Applicants for admission to any department of the University will be required to furnish satisfactory evidence of good moral character, and a certificate of graduation or of honorable dismissal from the schools with which they were last connected.

For admission to the Freshman class, applicants must be at least sixteen years of age and must satisfy requirements in subjects sufficient to give sixteen credits as described below. A credit is understood to be the equivalent of one study pursued satisfactorily for one year, one period a day, as ordinarily taught in high schools.

Students coming from approved high schools, and presenting a detailed official statement of work completed from the principals of such schools, will be excused by the committee on registration from entrance examinations in those subjects covered by the credentials, with the exception of English composition. Other students will be required to pass the entrance examinations.

For admission to the course leading to the degree of Bachelor of Philosophy, the subjects and credits assigned each are:

English	4	Latin	3
Mathematics	2	Greek, French, German or Spanish	2
History and Civics	2	Elective	2
Science	1		

For admission to the course leading to the degree of Bachelor of Science, including the degrees of Bachelor of Science in Mining Engineering, Civil Engineering, Mechanical Engineering, Metallurgy, or Agriculture, the subjects and credits assigned each are:

English	4	French, German or Spanish	2
Mathematics	4	Science (Physics required)	3
History and Civics	2	Elective	1

The scope of work required in these various subjects is as follows:

ENGLISH—(a) English classics. An acquaintance with the works named below. These works are divided into two classes, those intended for thorough study and those intended for general reading. The portion of the examination devoted to the former class will be upon subject matter, form and structure. In addition, the candidate may be required to answer questions involving the essentials of English Grammar, and the leading facts in those periods of English literary history to which the prescribed books belong. In the portion of the examination devoted to the latter class, the candidate will be required to present evidence of a general knowledge of the subject matter, and to answer simple questions on the lives of the authors. The form of examination will usually be the writing of a paragraph or two on each of several topics, to be chosen by the candidate from a considerable number—perhaps ten or fifteen—set before him in the examination paper. The treatment of these topics is designed to test the candidate's power of clear and accurate expression, and will call for only a general knowledge of the substance of the books. In preparation for this part of the requirement, it is important that the candidate shall have been instructed in the principles of writing English. A knowlede of grammar is presupposed. (b) English composition. This requirement can be met only by examination of the candidate or by his presenting satisfactory composition books of themes certified by a former teacher as original uncorrected work. The examination will take the form of a theme of five hundred words on some subject familiar to the candidate and will be a practical test of his ability to express himself in writing clearly and consecutively. No candidate will be accepted whose work is notably defective in point of neatness, spelling, punctuation, idiom, or division into paragraphs. Those found lacking in composition will be required to make good the deficiency at once in a special class organized for that purpose.

No student will be admitted without examination, except on the certificate from his former instructors that the entire requirement has been fulfilled. Substantial equivalents, properly certified, will be accepted.

For thorough study: For 1907, Shakespeare's *Julius Cæsar;* Milton's *L'Allegro*, *Il Penseroso*, *Comus*, *Lycidas;* Burke's *Speech on Conciliation with America;* Macaulay's *Essays on Johnson and Addison*.

For general reading: For 1907, Shakespeare's *Merchant of Venice* and *Macbeth;* the *Sir Roger de Coverly*

Papers in "The Spectator;" Irving's *Life of Goldsmith;* Coleridge's *Rime of the Ancient Mariner;* Scott's *Ivanhoe;* Carlyle's *Essay on Burns;* Tennyson's *Idylls of the King;* Lowell's *Vision of Sir Launfal;* George Eliot's *Silas Marner.*

MATHEMATICS—Arithmetic as covered in White's *Advanced Arithmetic* to the appendix, but these subjects will be omitted in the entrance examinations: longitude and time, present worth, stock investments, exchange, equation of payments, compound proportion, partnership and cube root, Algebra, through quadratic equations, as given in Wells' *Essentials of Algebra* or Wentworth's *New School Algebra*. Plane geometry as treated in the latest editions of Wentworth or Wells. For students in the scientific or engineering courses, solid geometry and trigonometry, each requiring a half-year of work, will be required.

GENERAL HISTORY AND CIVICS—As much as is included in Adams's *European History;* Hinsdale's *American Government*, or Hart's *Actual Government*, together with Channing's *Student's History of the United States*, or Montgomery's *Student's American History*, or text books covering equivalent ground. To meet these requirements a large amount of reference work is expected. In place of general history the following will be accepted: History of Greece and Rome as contained in Myers' histories of Greece and Rome, or an equivalent; and Coman and Kendall's or Larned's *History of England.*

*GREEK—As covered by Gleason and Atherton's *Beginners' Greek Book;* Xenophon's *Anabasis*, four books; Homer's *Iliad*, three books, with composition and the use of Hadley and Allen's, or Goodwin's *Greek Grammar*.

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*If any language is offered it must be to the extent of two credits, since a single year's study of a language is not considered of sufficient educational value to be entitled to credit.

*LATIN—As covered by Collar's *First Latin Book* and *Viri Romæ*, together with Allen and Greenough's *Grammar* and texts; sight reading; Cæsar, four books, or an equivalent; Cicero, four orations; Virgil, six books; sight reading from Nepos, Cicero and Gellius; Daniell's or Bennett's *Prose Composition*.

*GERMAN — As covered by Thomas' *German Grammar*, with readings outlined for German 1, 2, 3, 4, or an equivalent.

*SPANISH—As covered by Hills and Ford's *Spanish Grammar* with readings, etc., outlined for Spanish 1, 2, 3, 4, or an equivalent.

*FRENCH—As covered by Fraser and Squair's *French Grammar* (Parts I and II) with readings, etc., outlined for French 1, 2, 3, 4, or an equivalent.

SCIENCE—Under this head may be offered the required number of credits in the following subjects: physical geography, physiology, botany, chemistry, physics or elementary astronomy. At least half the preparation in science should consist of laboratory work. Note-books, containing such laboratory work as has been performed by the student, should be presented for examination.

ELECTIVE—The remaining credits required may be made up from additional subjects ordinarily taught in high schools.

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*If any language is offered it must be to the extent of two credits, since a single year's study of a language is not considered of sufficient educational value to be entitled to credit.

Students from other institutions of equivalent rank may be admitted to classes higher than freshman upon presentation of properly authenticated certificates showing to the satisfaction of the faculty that they are qualified to proceed with their required work. These certificates must be accompanied by statements of honorable dismissal, or leave of absence.

By arrangements with the Arizona Normal School at Tempe, and the Northern Normal School at Flagstaff, students from these institutions will be received into the University without examination, and given credit for all work which is the equivalent of courses offered by the University either for admission or for a degree. Students from this University may also obtain the equivalent privilege at the Normal Schools by presenting the proper certificate of standing, signed by the president.

The faculty desires to establish such relations with high schools and other educational institutions as will enable it to accept their certificates without question. To this end presiding officers are respectfully requested to correspond with the President.

COURSES OF STUDY AND DEGREES.

All facilities and privileges of the University are open to qualified persons of both sexes.

The University offers four-years courses of study leading to the degrees of Bachelor of Philosophy and Bachelor of Science, and to those degrees specialized as shown on pages 48-49. In each course the work is partly required and partly elective, as described by schedules later. Each student doing full work is required to take not less than sixteen hours of class room work per week. In laboratory work a period from two to three hours is considered the equivalent of one recitation hour.

Persons of mature age and with sufficient preparation, who are not candidates for degrees, may be admitted to regular classes as special students, provided, however, that in all such cases they show to the satisfaction of the instructors in charge that they can take the course with profit to themselves and without detriment to the regular class. It is expected that those who desire thus to specialize in mineralogy, assaying, geology or surveying, will have had at least a high school education, or its equivalent, particularly in English, algebra, geometry, physics and chemistry.

The faculty reserves the right to omit classes in any course of instruction unless a suitable number of students register for the course.

Students who have completed satisfactorily the reqruied work, and the specified amount of elective work, as shown in the accompanying schedules, will be given the degree of Bachelor of Philosophy or Bachelor of Science. The special character of any course of study may be indicated by adding to the degree the name of the department, as: Bachelor of Science in Mining Engineering, or Bachelor of Science in Metallurgy.

Military science and tactics or, for women, physical culture, is required during the Freshman and Sophomore years. If for any reason a student is excused from these exercises, an additional subject having a minimum of three recitation hours per week will be required.

Credit toward degrees is given by means of a unit system which assigns to each course of instruction offered a certain number of units of credit. A unit ordinarily represents one class-room hour per week, or its equivalent of two or three laboratory hours, for one semester. One hundred and twenty-eight units besides six units in military science and tactics and physical culture, are required for obtaining a degree in any course.

Any candidate for a degree may present as part fulfillment of requirements for graduation an acceptable thesis embodying the result of a special study of some subject within the range of the course pursued. The subject of the thesis must be submitted for the approval of the faculty at the opening of the Senior year, and the completed thesis must be presented not later than three weeks before commencement day. The credit value will be determined by the faculty at the time the subject is approved.

GROUPS OF COURSES.

General—English, Mathematics.

Group A—Latin, Greek, French, German, Spanish.

Group B—History, Economics, Philosophy, Sociology, Domestic Science.

Group C—Astromony, Botany, Chemistry, Geology, Mineralogy, Physics, Zoology.

Group D—Civil Engineering, Mechanics Arts, Mechanical Engineering, Metallurgy, Mining Engineering.

The units necessary for the different degrees are as follows:

BACHELOR OF PHILOSOPHY.

a Required—English, 24; Philosophy, 15; History and Economics. 8.

b Group Elective—From Group A, 32; Group C, 16.

c Free electives—33.

BACHELOR OF SCIENCE.

a Required—English, 8; Mathematics, 16.

b Group Electives—From Group B, 4; Group C and D, 56.

c Free electives—44.

For the degrees of Bachelor of Science in Mining Engineering, Metallurgy and Civil Engineering, the same work is required in all for the first two years, with differentiation during the third and fourth years, as shown on the following pages.

Mining Engineering, Metallurgy, Civil Engineering.

First year.		Second year.	
English, 1, 2	6 units	Mathematics, 3, 4	6 units
Mathematics, 1, 2	10 "	Physics, 1, 2	8 "
Chemistry, 1, 2	8 "	Chemistry, 3, 4	8 "
Mech. Arts, 1,2,3,4	8 "	Mech. Arts, 5, 6	4 "
	32 "	Civil Eng., 1, 2	8 "
			34 "

Mining Engineering.

Third year.		Fourth year.	
Mathematics, 5, 6	9 units	Mining Eng., 1, 2	8 units
Mineralogy, 1, 2	7 "	Geology, 3, 4	6 "
Geology, 1, 2	8 "	Metallurgy (lect.)	3 "
Civil Eng., 5, 6	8 "	Civil Eng., 10	4 "
	32 "	Mineralogy, 3, 4	4 "
		Mech. Eng., 1, 2	6 "
			31 "

Metallurgy.

Third year.		Fourth year.	
Mathematics, 5, 6	9 units	Metallurgy, 1, 3, 4, 5, 6	13 units
Mineralogy, 1, 2	7 "	Mining Eng., 1	4 "
Geology, 1, 2	8 "	Civil Eng., 5,6 or 10	8 "
Chemistry, 5, 6	8 "	Mech. Eng., 1, 2	6 "
	32		30

Civil Engineering.

Third year.		Fourth year.	
Mathematics, 5, 6	9 units	Civil Eng., 7, 8	8 units
Civil Eng., 5, 6	8 “	“ “ 10	4 “
“ “ 4	1 “	Mech. Eng., 1, 2	6 “
“ “ 9	4 “	Elective	12 “
“ “ 12	2 “		30
Mineralogy, 1	4 “		
Physics, 4	4 “		
	32		

Mechanical Engineering.

Second year.	
Mathematics, 3, 4	6 units
Physics, 1 2	8 “
Mech. Arts, 5, 6	4 “
Mech. Eng., 3, 4	6 “
Civil Eng., 1, 2	8 “
	32

Third year.		Fourth year.	
Mathematics, 5, 6	9 units	Mech. Eng., 5, 6	8 units
Civil Eng., 5, 6	8 “	“ “ 7, 8	8 “
Mech. Eng., 1, 2	6 “	Civil Eng., 10	4 “
Physics, 3, 4	7 “	Elective,	10 “
Mech. Arts, 7, 8	4 “		30
	34		

COURSES OF INSTRUCTION.

Courses having odd numbers are given in the first semester; those having even numbers, in the second semester. The hours mentioned show the number of periods per week. The subjects are arranged alphabetically.

ASTRONOMY.

PROFESSOR DOUGLASS.

The wonderful atmosphere of Southern Arizona is the best in the United States for astronomical observation, because it has a smaller percentage of cloud and a lesser average wind velocity than any other locality where records have been preserved. The dry air and 2400 feet elevation give Tucson such a clear sky that faint stars may be watched till they set behind the distant horizon. The fine weather, day after day, gives opportunity for a consecutiveness of observation not obtainable elsewhere. A greater portion of the year is available, with less interference from air currents. This certainty of having clear weather at any given time is of the utmost importance.

The course in Astronomy is arranged especially to draw attention to these advantages, and, at the same time, to give that understanding of the motions of the earth and planets which is so important in many branches of engineering. The four and one-fourth inch Brashear telescope of the University will always be available for closer study of the heavenly bodies. An excellent clock with electric connections for transmitting time gives opportunity for longitude, latitude and time observations. It is hoped in the coming year to install other instruments that will take advantage of the exceptionally favorable conditions so peculiar to Arizona.

ASTRONOMY 1, 2. DESCRIPTIVE ASTRONOMY—The study of the sun, moon and planets and other celestial objects, with constant views of their telescopic appearance and discussion of the latest theories of the evolution of the universe and the condition of the planets. This course will include some research work for which the admirable climate affords opportunity. Open to all students. 3 hrs., or an equivalent, both semesters. 6 units.

BIOLOGY.

PROFESSOR THORNBER, MISS TILLMAN.

The courses which follow are calculated to articulate with the work done in biology in the average western high school.

The Desert Botanical Laboratory of the Carnegie Institution of Washington, D. C., is located in the mountains just west of Tucson. In this laboratory, the southwest with its unique and, as yet, little investigated flora, gains what is destined to be one of the important centers of active, scientific research. The research facilities of the laboratory are all that could be desired, and the investigations upon the desert flora will appeal to students of botany from all quarters. In the light of the above, the importance of the Desert Botanical Laboratory to the University of Arizona and especially to the department will be apparent.

BOTANY, 1, 2. GENERAL BOTANY—Botany 1 treats of the general principles of the histology and physiology of plants. Botany 2 completes the year's work with a general survey of plant types from Protophyta to Spermatophyta. Guide, Bessey's *Essentials of Botany* supplemented with lectures. Laboratory studies will form the basis of all the work. Open to all students. 4 hrs., or an equivalent, both semesters. 8 units.

BOTANY 3, 4. ADVANCED BOTANY—The second year's work is not definitely outlined, but it is purposely left open to be formulated as the needs of the students applying appear to demand. Courses in general morphology of the fungi, histology, physiology, and the taxonomy and ecology of the native flora are offered here. Opportunities are offered for research work. Open to all students who have taken Botany 1, 2. 4 hrs., or an equivalent, both semesters. 8 units.

ZO-OLOGY 1, 2—Conducted along lines corresponding very closely to those followed in Botany 1, 2. Laboratory studies as in that course are made the main feature of the work. In the study of the Mammalia constant reference is made to human anatomy. Textbook, Parker and Hazwell, *Manual of Zo-ology*. Open to all students. 4 hrs., or an equivalent, both semesters. 8 units.

CHEMISTRY.

PROFESSOR GUILD, ASST. PROF. BENNER.

The instruction in chemistry has two main objects in view; first, to promote general culture; and secondly, to introduce students to technical work, especially in mining. The first two years' work in general chemistry, qualitative and quantitative analysis, places the student in a position to take up advantageously the study of mining, agricultural chemistry or metallurgy.

CHEMISTRY 1, 2. Lectures and recitations illustrating the chemical properties of the elements and their compounds. Text-books, Newth, *Inorganic Chemistry*, Eliot and Storer, *Qualitative Analysis* and various reference books. Open to all students who have taken courses amounting to one year each in preparatory chemistry and physics. 4 hrs., or an equivalent, both semesters. 8 units.

CHEMISTRY 3. QUANTITATIVE ANALYSIS—Laboratory practice with lectures and recitations; the work will be chiefly in gravimetric methods of analysis. Open to students who have taken Chemistry 2. 4 hrs., or an equivalent, first semester. 4 units.

CHEMISTRY 4. VOLUMETRIC ANALYSIS—A continuation of the work in Chemistry 3, special attention being given to the methods of assaying employed in the West. 4 hrs., or an equaivalent, second semester. 2 units, if discontinued March 15th; otherwise, 4 units.

CHEMISTRY 5, 6. SPECIAL QUANTITATIVE ANALYSIS—The analysis of water, gases, oils, minerals. Open to students who have taken Chemistry 4. 4 hrs., or an equivalent, both semesters. 8 units.

*CHEMISTRY 7, 8. ORGANIC CHEMISTRY—Lectures on the carbon compounds; laboratory work in organic analysis and the preparation of organic compounds; vapor density and molecular weight determination. Open to students who have taken chemistry 3, 4. 4 hrs., or an equivalent, both semesters. 8 units.

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*Omitted 1906-7.

*CHEMISTRY 9. SYNTHETIC CHEMISTRY—The preparation of pure chemical compounds from the crude mineral products. Open to students who have taken Chemistry 4. 2 hrs., or an equivalent, first semester. 2 units.

*CHEMISTRY 10. PHYSICAL CHEMISTRY—Lectures. Historical introduction leading up to a discussion of modern chemical theories. Open to students who have taken Chemistry 3. 2 hrs., second semester. 2 units.

CHEMISTRY 11, 12. CHEMISTRY OF THE RARE ELEMENTS—The analysis and synthesis of uranium, molybdenum, tungsten, vanadium and cerium compounds. Open to student who have taken Chemistry 6 and 9. 4 hrs., or an equivalent, both semesters. 8 units.

CIVIL ENGINEERING.

PROFESSOR HOUSTON, MR. CHAPIN, MR. BARTHELS.

The courses in this department have been arranged with special reference to the engineering development of the Southwest. Especial stress will be laid on surveying, railroad and bridge work, and irrigation engineering. The design throughout the courses is to give the student a thorough and practical knowledge of the essential principles of his profession, and to teach the technical practice of the times so far as possible without sacrificing in other directions. Engineering practice changes from year to year and a graduate who is thoroughly grounded in the principles of his profession will readily acquire the technical side.

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*Omitted 1906-7.

CIVIL ENGINEERING 1, 2. SURVEYING—Use and care of instruments, including plane and solar compasses, levels, transits; plane land surveying; United States system of land surveys; city, topographical and mine surveying; earthwork computations; determination of azimuth, latitude, longitude and time by observations on the circumpolar stars and on the sun. One full half-day each week is devoted to field practice; plots are made of field surveys and a topographic map of some area in the vicinity of Tucson is executed by each student. Lectures, recitations, drawing and fieldwork. Textbook, Raymond, *Surveying*. Open to students who have taken trigonometry. 4 hrs., both semesters and Saturday forenoons. 8 units.

*CIVIL ENGINEERING 5. GEODESY—Size and shape of the earth; latitude, longitude and azimuth formulas; base line apparatus; trigonometric leveling. Lectures and fieldwork. 1 hr., second semester. 1 unit.

*CIVIL ENGINEERING 5. MATERIALS OF CONSTRUCTION—Their properties, preparation and use; stone, brick, lime, cement, concrete, timber, iron and steel. Lectures, recitations and laboratory work. 4 hrs., first semester. 4 units.

*CIVIL ENGINEERING 6. MASONRY CONSTRUCTION—Foundations on land and in water, cofferdams, cribs, caissons, round and sheet piling, bridge piers and abuttments, retaining walls, dams, arches, the theory and practice in reinforced concrete construction. Graphical methods of determining stability. 4 hrs., second semester. 4 units.

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*Omitted 1906-7.

CIVIL ENGINEERING 7, 8. MODERN FRAMED STRUCTURES—Stresses in the various types of bridges under different systems of loading; graphical investigation of stability of arches and retaining walls; complete design with drawings for a plate girder bridge, and a steel frame building. Text-book, Merriman and Jacoby, *Roofs and Bridges*. 4 hrs., both semesters. 8 units.

CIVIL ENGINEERING 9. RAILROAD ENGINEERING—Preliminary and location surveys; simple and easement curves, turnouts and switches; principles of economic location as based upon cost of construction, operating expenses, alignment, and grades; maintenance-of-way. The fieldwork consists of the surveys for a railroad of sufficient length to secure familiarity with the methods of actual practice. Each student makes a complete set of notes, maps, profiles, calculations and estimates of cost. Open to students who have taken Engineering 1, 2. 4 hrs., until December; one haur and Saturdays through December and January. 4 units.

CIVIL ENGINEERING 10. HYDRAULICS—Velocity and discharge from orifices, weirs, tubes and pipes; flow in sewers, ditches, canals and rivers; measurement of water power; water wheels of various types. Text-book, Merriman, *Hydraulics*. 4 hrs., first semester. 4 units.

*CIVIL ENGINEERING 11. PRINCIPLES OF IRRIGATION—A study of the present condition of irrigation development in the United States; irrigation legislation; methods af establishing rights to water; a brief reference to the engineering principles relating to the construction and maintenance of canals and reservoirs and the various means of diverting and measuring water for use in irrigation. Prerequisite, Engineering 2. 2 hrs., second semester. 2 units.

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*Omitted 1906-7.

ECONOMICS.

PRESIDENT BABCOCK.

ECONOMICS 1, 2. A study af the general principles and laws of economics based upon Seager, *Introduction to Economics*. Special attention is given to the study and criticism of socialism, and the problem of municipal and government ownership of natural monopolies and public utilities. 3 hrs., both semesters. 6 units.

*__ECONOMICS 3, 4.__ A general study of the history and theory of Economics based upon Marshall, *Principles of Economics*, with lectures and required reading. This course aims to acquaint the students with the different modern theories, and economic plans for reform. 3 hrs., both semesters. 6 units.

ENGLISH.

PROFESSOR NEWSOM, MISS LUTRELL.

The purpose of the courses outlined below is to give a general knowledge of English literature from the fourteenth century to the present time. Chief stress is placed upon the study of the leading authors of the most important periods, though the history of our literature is also traced from age to age. The course in composition aims to develop accurate thought and clear, vigorous expression.

ENGLISH 1 and 2. COMPOSITION—Prescribed for all freshmen. *First Semester:* Short weekly themes corrected and rewritten. Selected readings from English and American writers of prose, with written and oral reports.

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*Omitted 1906-7.

Second Semester: Fortnightly themes illustrating methods in narration, description, exposition and argumentation. Hill's *Beginnings of Rhetoric and Composition*, supplemented by lectures. Selected readings and reports thereon as in the first semester. 3 hrs., both semesters. 6 units.

ENGLISH 3, 4. NINETEENTH CENTURY PROSE—Primarily for freshmen. From the publication of the Lyrical Ballads to the death of Ruskin (1798-1899.) This course deals with the following writers: Scott, Coleridge, Lamb, Landor, Austen, Hazlitt, DeQuincey, Carlyle, Macaulay, Newman, Thackeray, Dickens, Eliot, Ruskin, Matthew Arnold. Weekly papers on assigned topics, lectures and discussions. 2 hrs., both semesters. 4 units.

ENGLISH 5, 6. SHAKESPEARE—For juniors and seniors. The following plays are read: *Midsummer Night's Dream*, *Romeo and Juliet*, *Henry V*, *Merchant of Venice*, *As You Like It*, *Twelfth Night*, *Hamlet*, *Othello*, *Lear*, *Macbeth*, *Timon*, *Tempest*. Some attention is given to the development of the Elizabethan drama and to Shakespeare's formative period. At least one play is read from each of the following writers: Lyly, Greene, Peele, Kyd and Marlowe. Lectures and discussions and a thesis of not less than 1500 words. 3 hrs., both semesters. 6 units.

*ENGLISH 7,8. EIGHTEENTH CENTURY LITERATURE—For Sophomores. From the death of Dryden to the publication of the Lyrical Ballads (1700-1798.) This course deals with the following writers: Defoe, Swift, Addison, Steele, Pope, Johnson, Horace Walpole, Burney, Beckford, Goldsmith, Burke. Weekly papers on assigned topics, lectures and discussions. 2 hrs., both semesters. 4 units.

*ENGLISH 9, 10. SEVENTEENTH CENTURY LITERATURE—For juniors and seniors. This course deals with Bacon, Milton, Herrick, Donne, Bunyan and Dryden. Weekly papers on assigned topics, lectures and discussions, and a thesis of not less than 1500 words. 2 hrs., both semesters. 4 units.

†ENGLISH 11, 12. POETRY—For juniors and seniors. From the publication of Thomson's *Winter* to the death of Tennyson (1726-1992.) This course deals with the following writers: Thomson, Collins, Gray, Blake, Burns, Wordsworth, Coleridge, Scott, Byron, Shelley, Keats, Matthew Arnold, Browning, Tennyson. Weekly papers on assigned topics, lectures and discussions, and a thesis of not less than 1500 words. 2 hrs., both semesters. 4 units.

†ENGLISH 13, 14. CHAUCER—For sophomores and juniors. In this course a large part of the *Canterbury Tales* is read, the *Prologue to the Legende of Gode Wommen*, and some of the minor poems. The course is purely literary and a knowledge of Anglo Saxon is not required. 3 hrs., both semesters. 6 units. Miss Lutrell.

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*Omitted 1906-7.

†To be given 1907-8.

DOMESTIC SCIENCE AND ART.

MISS TILLMAN.

The courses in Domestic Science and Art are planned for two classes of students: (1) Girls who wish to acquire a knowledge of the household arts in connection with other studies of the preparatory department. (2) College students who receive college credit for the work.

The course for the preparatory students is of a more practical nature, while the college course pays especial attention to the scientific principles underlying the work and pre-supposes the students to have had chemistry and at least one of the biological sciences.

The entire course has for its object the training of the student in the principles of science as applied to daily living, thus demonstrating the value of science, economics and ethics in the betterment of the home.

DOMESTIC SCIENCE 1, 2. FOOD ECONOMICS—The classification of food stuffs, nutritive and money values; the application of the principles of pure science to the problems of nutrition, dietary work, preservation and preparation. 2 hrs., or an equivalent, both semesters. 4 units.

DOMESTIC ART 3. TEXTILES—Lectures on textiles, production, properties, manufacture, etc. Laboratory work in hand sewing, drafting of patterns from simple measurements and plain sewing. 2 hrs., or an equivatent, first semester. 2 units.

DOMESTIC ART 4. HISTORY OF COSTUME—Lectures on the history of costume; the making of patterns from systems; designing, dressmaking, tailor pressing and construction; practical millinery. 2 hrs., or an equivalent, second semester. 2 units.

FRENCH.

PROFESSOR TURRELL, ASSISTANT PROFESSOR LIGDA.

FRENCH 1, 5. First Semester: Fraser and Squair, *French Grammar* (Part I), Aldrich and Foster, *French Reader*. Second Semester: Reading of Daudet, *La Belle Nivernaise*, Labiche and Martin, *La Poudre aux Yeux*, Halévy, *L'Abbe Constantin*. Composition and dictation, with drill on the irregular verbs. 5 hrs., both semesters. 8 units. Assistant Professor Ligda.

FRENCH 3, 4. First Semester: Fraser and Squair, *French Grammar* (Part II.) Merimée, *Colomba*, Lamartine, *Graziella* or *Jeanne d'Arc*, Feuillet, *Le roman d'un jeune homme pauvre*. Second Semester: Selected readings, as DeVigny, *Cinq Mars*, Canfield, *French Lyrics*, Victor Hugo, *Les Miserables*, etc. 5 hrs., both semesters. 8 units. Professor Turrell.

*FRENCH 5. THE CLASSICAL FRENCH DRAMATISTS. Reading of plays of Corneille, Racine and Moliere. Study of the history of French literature to the 19th century. 3 hrs., first semester. 3 units. Professor Turrell.

*FRENCH 6. HISTORY OF FRENCH LITERATURE IN THE 19TH CENTURY. Class reading of recent writers as Daudet, Dumas, Zola, Verlaine, Coppée, Rostand, etc. 3 hrs., second semester. 3 units. Professor Turrell.

GEOLOGY.

PROFESSOR TOLMAN.

The courses in Geology are constructed with special reference to the following: 1st, the development of the observational faculties; 2nd, training in inductive and deductive reasoning whereby each student discovers for himself the causes for each phenomenon observed; 3rd, practical application of geological principles to mining with special training in structural geology and mapping.

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*Omitted 1906-7.

GEOLOGY 1, 2. GENERAL GEOLOGY—Geological processes, their causes and effects. The atmosphere, surface and underground water, the ocean and the ice and snow as geological agents. Earth movements; mountain and continent building; vulcanism. Rocks, their origin and alterations. Structural geology (problems through the entire course.) Short review of the physical history of the earth and correlated life progress. Detailed study of ore deposits.

Geological excursions once a month. Laboratory work is given in connection with the study of rocks, structural geology and ore deposits. Open to students who have taken or are taking mineralogy 1, 2. 4 hrs. a week, both semesters. 8 units.

GEOLOGY 3, 4. TOPOGRAPHICAL AND FIELD GEOLOGY—Constructions of maps and sections. United States Geological Survey methods of geological mappings. Geological mine mapping and stenography. Two geological maps are required of each student, one of a portion of the Tucson mountains (composed of lava flows) and one of a district in the Rincon mountains (faulted and folded sedimentary rocks.) Prerequisite Geology 1, 2. All day Saturdays, both semesters. 6 units.

GERMAN.

PROFESSOR TURRELL.

GERMAN 1, 2. First Semester: Bacon, *New German Course*, complete. Second semester: Reading of easy texts, such as Andersen, *Bilderbuch ohne Bilder*, Storm, *Immensee*, von Hillern, *Hoeher als die Kirche*, Gerstaecker, *Germalhausen*. Composition, dictation and continued grammar drill. 5 hrs., both semesters. 8 units.

GERMAN 3, 4. First Semester: Thomas, *German Grammar* (Part II.) Reading of Meyer-Foerster, *Karl Heinrich*, Heine, poems and *Die Reisebilder*, Lessing, *Minna von Barnhelm*. Second Semester: Goethe, *Hermann und Dorothea*, *Egmont*, Schiller, *Wilhelm Tell*, *Maria Stuart*. An outline of the history of German literature will be given during the year, using Bernhardt, *Deutsche Litteraturgeschichte*, with library readings. 5 hrs., both semesters. 8 units.

GERMAN 5. GERMAN LITERATURE IN THE NINETEENTH CENTURY. The Romanticists and their successors. Class reading of Kleist, *Der Prinz von Homburg*, Grillparzer, *Der Traum ein Leben*, etc. Lectures and library readings. 3 hrs., first semester. 3 units.

GERMAN 6. RECENT LITERARY MOVEMENTS IN GERMANY. The rise of naturalism and symbolism. Reading of Wildenbruch, *Harold*, Fulda, *Der Talisman*, Sudermann, *Johannes*, Hauptmann, *Die Versunkene Glocke*. 3 hrs., second semester. 3 units.

HISTORY.

PRESIDENT BABCOCK, MR. ———

In the work in history emphasis is placed on the social and political development, the relation of cause and effect, and the unity of history. The laboratory method is used whenever possible and individual work insisted upon.

*HISTORY 1, 2. ENGLISH HISTORY—Gardiner's *Students' History of England* is used as the basis for the work, with much assigned reading and the preparation of reports. Open to all students. 4 hrs., both semesters. 8 units.

*HISTORY 3, 4. AMERICAN COLONIAL HISTORY—A detailed study of the American colonies under Great Britain, and of the United States to the adoption of the Constitution. Lectures, assigned reading and reports. Open to students who have taken History 1, 2. 3 hrs., both semesters. 6 units.

HISTORY 5, 6. CONSTITUTIONAL HISTORY OF THE UNITED STATES—A detailed study of the formation of the Union and of the political and constitutional history of the United States down to 1856, based on letters and speeches of American statesmen, public documents and special histories. Open to students who have taken Historry 1, 2. 3 hrs., both semesters. 6 units. President Babcock.

LATIN.

MRS. NEWSOM.

The courses below are open to students who have completed the first three years of Latin in the sub-collegiate department, or an equivalent. Constant, thorough drills are given in technical grammar and prose composition. In reading, the matter is subjected to grammatical, metrical, rhetorical and historical explanation. The study of the text is made the means of mental discipline, of developing the faculties of observation and critical judgment, and of acquiring habits of thoroughness and accuracy.

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*Omitted 1906-7.

LATIN 1, 2. Virgil, Books V and VI; Livy, selections; Cicero, *de Senectute*, *de Amicitia*. Exercises in prose composition. 4 hrs., both semesters. 8 units.

LATIN 3, 4. Tacitus, *Germania and Agricola*, selections from histories; Horace, *Odes*. 3 hrs., both semesters. 6 units.

MATHEMATICS.

PROFESSOR E. M. BLAKE, ASSISTANT PROFESSOR MEDCRAFT.

MATHEMATICS 1. COLLEGE ALGEBRA—Four hours per week. GRAPHICAL METHODS. One two-hour laboratory period per week. First semester. 5 units. Assistant Professor Medcraft.

MATHEMATICS 2. PLANE AND SPHERICAL TRIGONOMETRY—Four hours per week. GRAPHICAL METHODS. One two-hour period per week. Second semester. 5 units. Assistant Professor Medcraft.

Mathematics 1 and 2 are prescribed for first year students in Mining Engineering, Metallurgy, Civil and Mechanical Engineering. The work in graphical methods is supplementary to algebra and trigonometry and introductory to analytical geometry.

MATHEMATICS 3. ANALYTICAL GEOMETRY—Prerequisite, Mathematics 1, 2. 3 hrs., first semester (1907-8 only.) Professor Blake. Second semester (repeated.) Assistant Professor Medcraft. 3 units.

MATHEMATICS 4. DIFFERENTIAL CALCULUS—Prerequisite, Mathematics 3. 3 hrs., second semester. 3 units. Professor Blake.

Mathematics 3 and 4 are prescribed for second year students in Mining Engineering, Metallurgy, Civil and Mechanical Engineering.

MATHEMATICS 5. INTEGRAL CALCULUS—Prerequisite, Mathematics 4. 4 hrs., including one laboratory period, first semester. 4 units. Professor Blake.

MATHEMATICS 5. ANALYTICAL MECHANICS—Prerequisites, Mathematics 5 and Physics 1, 2. 5 hrs., including one laboratory period, second semester. 5 units. Professor Blake.

Mathematics 5 and 6 are prescribed for third year students in Mining, Civil and Mechanical Engineering.

NOTE—Beginning September, 1907, trigonometry will be a preparatory subject and analytical geometry a freshman subject; calculus will be given during the whole sophomore year; and analytical mechanics will occupy the whole junior year.

MECHANIC ARTS.

PROFESSOR HOLMES, PROFESSOR HENLEY.

The mechanic arts courses comprise the elements of drawing and shop work. The work consists of lectures, recitations, drawing, tool and machine work. The courses are designed with special regard for the needs of the students in engineering.

MECHANIC ARTS 1. MECHANICAL DRAFTING—Lettering, tracing and blue printing. 3 two-hour periods a week, first semester. 2 units. Professor Holmes.

MECHANIC ARTS 2. DESCRIPTIVE GEOMETRY—Church's seventeen problems on lines and planes. 3 two-hour periods a week, second semester. 2 units. Professor Holmes.

MECHANIC ARTS 3. WOOD SHOP—Joinery, bench and lathe work, elements of pattern making. 2 three-hour periods a week, first semester. 2 units. Professor Henley.

MECHANIC ARTS 4. FORGE SHOP—Forge work in iron and steel, tempering, case hardening and annealing. 2 three-hour periods a week, second semester. 2 units. Professor Henley.

MECHANIC ARTS 5, 6. MACHINE SHOP—Bench and floor work, drill press, lathe, planer, milling machine, grinder, etc. 2 three-hour periods, both semesters. 4 units. Professor Henley.

MECHANIC ARTS 7, 8. ADVANCED SHOP WORK—Manufacturing methods, erection of machinery. Open to students who have had Mechanic Arts 1, 3, 4, 5 and 6. Two periods, both semesters. 2 units. Professor Henley.

*MECHANIC ARTS 9, 10. ADVANCED DESCRIPTIVE GEOMETRY—This course is a continuation of Mechanic Arts 1, 2. Church, *Descriptive Geometry*, is the text-book used. The work covers shade, shadow and perspective. Open to all students who have taken Mechanic Arts 1, 2. 2 periods or an equivalent, both semesters. 4 units. Professor Holmes.

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*Omitted 1906-7.

MECHANICAL ENGINEERING.

PROFESSOR E. M. BLAKE.

MECHANICAL ENGINEERING 1. HEAT ENGINES—Principles of thermodynamics as applied to steam and internal combustion engines, and compressed air machinery. Study of the general structural features and methods of operating the more important types of boilers, steam and gasoline engines. 2 hours and one weekly laboratory period, first semester. 3 units.

MECHANICAL ENGINEERING 2. DYNAMO-ELECTRIC MACHINERY—Theory underlying the generation, transmission and utilization of electric currents. Descriptions of the more important types of generators and motors. 2 hours and one weekly laboratory period, second semester. 3 units.

MECHANICAL ENGINENRING 3, 4. KINEMATICS OF MACHINERY AND ELEMENTARY MACHINE DESIGN. Theory and design of linkages, gears, cams, screws, etc. Two drafting room periods of two hours each per week, both semesters. 4 units.

MECHANICAL ENGINEERING 5. MACHINE DESIGN—Continuation of Mechanical Engineering 3, 4. Exercises in design particularly directed towards the designing of complete machines. Three drafting room periods of three hours each per week, first semester. 4 units.

MECHANICAL ENGINEERING 6. MECHANICAL ENGINEERING—Study of power plants and other machinery installations as to arrangement of parts, adaptability to intended work, economy of first cost and operation. Exercise in design of power plants and writing of specifications. As a part of this course, trips will be made to machinery installations in mining districts of Arizona and Sonora, usually one or two weeks in March or April. One lecture and two drafting room periods of three hours each per week, second semester. 4 units.

MECHANICAL ENGINEERING 7, 8. MECHANICAL LABORATORY—Operation, inspection and testing of boilers, steam and gasoline engines, compressed air machinery, pumps and electric machinery. Three laboratory periods of three hours each per week throughout the year. 8 units.

METALLURGY.

PROFESSOR DE LASHMUTT.

METALLURGY 1. INTRODUCTION TO METALLURGY—Physical properties of metals, alloys, thermal treatment of metals, thermal measurements, fuel, refractory materials, metallurgical processes, furnaces, thermo-chemistry, metallurgy of iron and steel. Seniors in Mining Engineering and Metallurgy. Lectures and recitations, 4 hrs., for 1 month, first semester. 1 unit.

METALLURGY 2. FIRE ASSAYING—Fire assay for gold, silver and lead. Bullion assays. 15 hrs. per week, or an equivalent, during March, April and May. Prerequisite, Chemistry 3 and 4. 2 units.

METALLURGY 3. METALLURGY OF GOLD AND SILVER—Stamp milling, chlorination, cyanidation, pan-amalgamation; Patio, Cazo, Fondon, Kröhnke and Tina processes, hyposulphite leaching practice, etc. Lectures and recitations. Prerequisites, Metallurgy 1 and 2. 4 hrs., first semester. To be given after completion of Metallurgy 1. 3 units.

METALLURGY 4. METALLURGY OF LEAD AND COPPER—Sampling, receiving, purchasing, roasting; blast furnace methods, reverberatory furnace methods; pyritic smelting, converting, desilveration of base bullion, electrolytic refining, hydro-metallurgy of copper, etc. Lectures and recitations. Prerequisites, Metallurgy 1, 2 and 3. 4 hrs., second semester. 4 units.

METALLURGY 5 and 6. METALLURGICAL LABORATORY—Concentration, amalgamation, cyanidation, chlorination, hyposulphite lixiviation, etc., tests together with mill work. 2 hrs., or an equivalent, both semesters. Primarily for seniors in the course in Metallurgy. 4 units.

METALLURGY 7. ORE DRESSING—Breaking, crushing, separating, concentrating, sampling; mill processes and management. Lectures and recitations. Prerequisites, Chemistry 3 and 4 and Metallurgy 2. 3 hrs., first semester. 3 units.

METALLURGY 8. Metallurgy of zinc, cadmium, nickle, mercury, bismuth, tin, antimony, cobalt, platinum, tungsten, molybdenum. Lectures and recitations. Prerequisites, Metallurgy 1, 2 and 3. 2 hrs., second semester. 2 units.

MILITARY SCIENCE AND TACTICS.

LIEUTENANT MC CLURE.

PRACTICAL COURSE—Infantry Drill Regulations, through the school of the battalion in close and extended order. Advance and rear guards, and outposts. Marches. The ceremonies of battalion review, inspection, parades, guard mounting and escort of colors. Infantry target practice. Instruction in first aid to the injured. Required of all able-bodied male students throughout the Freshman and Sophomore years, except that students who have satisfactorily completed four years of drill at the end of Freshman year may be excused from further work in the department. Elective during the remainder of the course. Juniors who elect this course may receive credit to the extent of two units. Three hours, both semesters.

THEORETICAL COURSE—The Infantry Drill Regulations covered by the practical instruction. The Manual of Guard Duty. Small-Arms Firing Regulations, Parts I, II and VII. The Articles of War. One lecture on camps and camp hygiene. Lectures on other military subjects. Required of all commissioned and non-commissioned officers. One hour, both semesters.

Students claiming exemption from drill will be required to secure a certificate of disability from a physician designated by the faculty. unless the disability is apparent. Those so excused will be required to elect a subject in place of this course. The officers will be appointed from an eligible list determined by examination, both scholarship and class standing being taken into account, according to the principles governing such selection at the United States Military Academy.

Each member of the military organization will be required to provide himself with the regulation uniform upon his entrance. A deposit covering the cost of the uniform should be made upon registration. The uniform consists of cap, coat and trousers of cadet gray cloth trimmed with black braid. and closely resembles the undress uniform of the United States Military Academy at West Point.

MINERALOGY.

PROFESSOR GUILD.

The main object of the course in mineralogy is to familiarize the student with facts and methods that will enable him to determine the character of an ore or mineral by an observation of its physical properties and by the performance of a few simple tests with the blowpipe. The value of such a course cannot be over-estimated, since these quick methods of analysis are frequently needed in the field and mine when recourse cannot be had to a well-equipped chemical laboratory. The course is of value also to the student of general science, since it adds to the pleasure of a day in the mountains or field, and is necessary to full appreciation of the study of geology. The course is not only practical, but the theoretical side of the subject receives attention in mineral optics, crystallography and similar topics.

MINERALOGY 1, 2. Lectures and recitations in crystallography and the classification and uses of minerals; laboratory work in blow-pipe analysis and determinative mineralogy; the study of a type collection of 600 minerals arranged and classified according to Dana.

Text-books: Dana, *Text-book of Mineralogy*, and Brush, *Manual of Determinative Mineralogy and Blow-Pipe Analysis*. Open to students who have taken Chemistry 2 and Physics 2. Units are distributed as follows: Crystallography, 2; blow-pipe analysis, 2; descriptive mineralogy, 3.

MINERALOGY 3. Advanced crystallography and microscopic study of the rock-forming minerals. Open to students who have taken Geology 2 and Mineralogy 2. 2 hrs., or an equivalent, first semester. 2 units.

MINERALOGY 4. PETROGRAPHY—The preparation of thin sections of rocks for microscopic study, rock analysis, and the study of a type selection of rocks. Text-book: Harker, *Petrology for Students*. Open to students who have taken Mineralogy 3. 2 hrs., or an equivalent, second semester. 2 units.

MINING ENGINEERIRG.

PROFESSOR TOLMAN.

In this course attention is largely directed to the economics of mining, and the laboratory work is so arranged that upon the completion of the course the student will have in his notes plans which will be of value in the practice of the profession.

MINING ENGINEERING 1, 2. Ores, their nature and occurrence; location of claims; mining laws of the important mining countries of the world; prospecting; excavations; tunnels, shafts and methods of timbering; underhand, overhand, square sett, filling and caving methods of mining; pumping; ventilation; transportation; hoisting; installation of machinery and surface improvements.

Methods for undeveloped properties compared with those for developed mines. Mine accounts, cost sheets, stope sheets, assay plans; methods of management, mine sampling and mine reporting. Prerequsites, Mathematics 5, 6, Geology 1, 2. 2 hours and two laboratory periods of 3 hours each, both semesters. 8 units.

MINING ENGINEERING 3. PRACTICAL MINING—Before entering upon the work of the Senior year. all students who are candidates for the degree of B. S. in Mining must have spent at least four weeks in practical underground mining. The fulfillment of this requirement must be evidenced by the certificate of the mine superintendent or foreman, and by notes and sketches of the processes observed, to be presented to the faculty of the School of Mines, and discussed with them.

MINING EXCURSIONS. MINING ENGINEERING 4—In connection with the courses in Mining Engineering, Metallurgy and Mineralogy, trips will be made to mining districts of Arizona and Sonora, usually one or two weeks in March or April. These trips are required of all candidates for the degree of B. S. in Mining Engineering.

The purpose of these trips is to afford the mining students an opportunity for close studv and inspection of mining and metallurgical plants, and of rock formations and of minerals of commercial value. The students are accompanied by two professors, and every effort is made to make the trips of the greatest practical value. The visits are carefully scheduled and notes, with sketches, measurements and photographs are taken, and elaborated into comprehensixe report by each student after the return. These trips are of incalculable assistance to the lecture, text book and draughting room work.

The subjects of special consideration are transportation, both above and below the surface, mine surveying, methods of stoping and timbering. the best treatment for each ore, assaying and furnace charges, smelting practices, concentration of low grade ores, power generation, pumping and water supply, and mill construction.

During 1905-6 the mining districts of Tombstone, Bisbee, Nacozari and Cananea, and the metallurgical plants at Douglas were visited in this way. The thanks of the University are due the superintendents of the various plants visited, for their efforts and care in acquainting the students with the works under their management.

MUSIC.

MR. HOOVER.

The department of music was established in September, 1906, with the primary object of furnishing instruction in vocal music, especially in the form of choruses and glee clubs. The work during the year 1906-1907 has consisted of a general chorus open to all students and required of all unexcused preparatory students, meeting twice a week; two glee clubs meeting twice a week (one for men and one for women); and an orchestra meeting twice a week. No college credit has been allowed for this work.

Mr. Hoover will also give private instruction in both vocal and instrumental work, at the rate of $20 for a term of ten weeks, two lessons per week. No University credit will be allowed for this work, nor is the University prepared to furnish full opportunilies for regular use of pianos for practice. The pianos in the dormitories may be used to a limited extent. provided the practice does not disturb ordinary study.

During the year 1907-1908, the following courses will be offered, with credit value as announced:

MUSIC 1, 2. ELEMENTARY CHORUS WORK, consisting of sight reading, elementary theory, training of the ear, and simple chorus work. Open to all students. Two half-hours throughout the year. 1 unit.

MUSIC 3, 4. ADVANCED CHORUS WORK, consisting of theory, harmony, and the heavier choral works. The class will be expected to form a part of the Annual Festival Chorus with the Tucson Choral Club. Open to all students sufficiently advanced to undertake the work. 2 hrs., both semesters. 2 units.

MUSIC 5, 6. GLEE CLUBS AND ORCHESTRA. Separate glee clubs will be formed for young men and young women. All three organizations will hold two rehearsals each per week. Open to all students who show the required proficiency as vocalists or with instruments. 2 hrs., both semester. 1 unit.

PHILOSOPHY.

MRS. STANLEY.

*PHILOSOPHY 1. HISTORY OF PHILOSOPHY—A study of the basal concepts and fundamental problems of philosophical thought as developed historically. Lectures, recitation and assigned reading. Text-book, Schwegler, *History of Philosophy*. 2 hrs., both semesters. 4 units.

*PHILOSOPHY 2. EVOLUTION—A study of the term in its widest extention, as the law of the cosmic process; its significance in the various departments of science and its bearing on philosophical and ethical thought. Reading in Fiske, *Cosmic Philosophy;* Le Conte, *Evolution and its Relation to Religious Thought;* Wallace, *Darwinianism;* Spencer, *Principles of Sociology;* Bagehot, *Physics and Politics*, and Howison, *Limits of Evolution*. Lectures and discussions. 2 hrs., both semesters. 4 units.

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*Omitted 1906-7.

*Philosophy 3. Psycholngy—A special consideration of the subject as applied to teaching. Lectures, recitations and collateral reading. Open to Juniors and Seniors. 4 hrs., first semester. 4 units.

Philosophy 4. Pedagogy—An account of educational evolution, both as a culture fact in the history of civilization and as a foundation for professional work; lectures, giving a brief but comprehensive outline of school systems, a special study of leading educators such as Comenius, Pestalozzi, Froebel, Mann and others; methods of teaching, school management and school law. Arrangements have been made with the Tucson city schools to use the Holliday school as a practice school for this class. Open to students who have taken Philosophy 1. 2 hrs., both semesters. 4 units.

Philosophy 5. Logic—Text-book, Jevons, *Logic*; reading from Mill, Hamilton, Thompson and others. Open to Juniors and Seniors. 4 hrs., first semester. 4 units.

Philosophy 6. Ethics—Theoretical and practical ethics; view of the historical development of the science; origin and development of the moral consciousness; application of the principles of ethics to the problems of life. Lectures, discussions and assigned reading. Open to Juniors and Seniors. 3 hrs., second semester. 3 units.

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*Omitted 1906-7.

PHYSICAL CULTURE.

ASSISTANT PROFESSOR LIGDA.

This department is organized to supply the opportunity for such physical work as experience has shown to be necessary under modern conditions, to counteract the deleterious effects of close application to mental work and to favor the attainment by the student body of a high state of physical efficiency.

It is intended that a thorough physical examination, including an examination of the eyes, heart and lungs, shall preface the work of every student in physical culture. This examination will be made as soon as possible after the student enters the University and at intervals during his or her course for safety and for determining the results of the work. Anthropometric cards and charts are platted for the students when desired. In special cases the University reserves the right to require a complete physical examination by a designated physician at the expense of the student.

In addition to the regular class drill a certain part of which consists of training and contests in athletic sports, the University is represented by teams in foot ball, base ball, track and field, tennis, and basket ball. Every facility is provided for track and field athletics. The field on the campus contains gridiron, base ball diamond, tennis and basket ball courts, sprinting paths, jumping and vaulting pits.

The course for women consists of systematic exercise for the harmonious development of the entire body, besides a course for the development of grace of movement and the production of symmetry of physique.

Special corrective machinery is supplied for this department, so that even the weakest students may be given proper and healthful exercise. Those pursuing this course are required to provide themselves with a gymnasium suit, consisting of a blouse waist and divided skirt with the regulation gymnasium shoes. The suit requires four yards of double width, 54-in. dark blue serge. The waist has a sailor collar trimmed with white braid. The Butterick pattern may be used or ready-made suits may be had at the gymnasium for $3.75.

The plan of work for the men is three-fold: general graded class work, corrective work and elective athletic work. The athletic work is taken in combination with the class work in order that the student by this combination may obtain the best possible development. The corrective work is given under special supervision to all those who are in need of special development, and, also, to those who are unable to do the regular class work.

PHYSICS.

PROFESSOR DOUGLASS.

The object of this course is to acquaint the student with the fundamental physical principles which underlie the higher courses of chemistry, mechanics and engineering. Special attention is therefore given to the study of force and energy, the physics of liquids and gases and heat. Owing to the great modern development of electricity, an important part of the course is devoted to this study. Note books are required in all courses.

PHYSICS 1, 2. GENERAL PHYSICS—Lectures, recitations and laboratory work. First semester: Mechanics and Heat with corresponding experiments in the laboratory. Second semester: Electricity, Wave Motion, Sound and Light. The laboratory experiments give prominence to general electrical measurement, but include the study of wave motions and their application to the other subjects. Open to students who have taken a course in elementary physics and Mathematics 1. 2 hrs. and 2 two-hour periods in the laboratory, or an equivalent, both semesters. 8 units.

PHYSICS 3. THERMODYNAMICS AND HEAT—A study of the foundation principles underlying mechanical engineering, latent and specific heats, conductivity, expansion, mechanical equivalent, high temperatures, cycles, entropy, properties of steam, etc. Prescribed for third year in mechanical engineering course. Two 2-hour laboratory periods and one hour for lecture or recitation, or an equivalent, first semester. 3 units.

PHYSICS 4. ELECTRICAL AND OPTICAL MEASUREMENTS—A study of the electrical machines and instruments used in mechanical engineering, and of the optical instruments handled in mining and civil engineering courses. Prescribed for the third year in mechanical and civil engineering courses. Two 3-hour periods, second semester. 4 units.

SOCIOLOGY.

MR. ———

*SOCIOLOGY 1. ELEMENTS OF SOCIOLOGY—A study of the nature, origin and development of the social forces; a treatment of the phenomena and laws of society as it is, including whatever conduces to or modifies human asssociation. Dealey and Ward, *Text-book of Sociology*, will be used as a guide and supplemented by lectures, collateral reading and reports. Open to Juniors and Seniors. 3 hrs., first semester. 3 units.

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*Omitted 1906-7.

*SOCIOLOGY 2. CHARITIES AND CRIME—A consideration of social pathology. including an examination of the origin and nature of the dependent, defective and delinquent classes. A study will be made of the principles and methods of relief; cause of crime; prison systems; juvenile offenders; preventative measures, etc. Guide, Warner, *American Charities*. Prerequisite, Sociology 1. 3 hrs., second semesters. 3 units.

SPANISH.

PROFESSOR TURRELL, MRS. HOCHDERFER.

SPANISH 1, 2. First semester: Hills and Ford, *Spanish Grammar;* Turrell, *Elementary Spanish Reader*, begun. Conversation and oral work. Second semester: Grammar and Reader completed; additional readings with composition work and dictation. 5 hrs., both semesters. 8 units. Mrs. Hochderfer.

SPANISH 3, 4. First semester: Reading of Alarcon, *El Capitan Veneno;* Galdó, *Marianela*. Second semester: Valdes, *La Alegria del Capitan Ribot;* Galdó, *Dona Perfecto*. Two hours each week throughout the year will be given to composition, letter-writing and syntax, using Ramsey, *Lo Esencial del Languaje Castellano*. 5 hrs.,both semesters. 8 units. Professor Turrell.

SPANISH 5. Lectures in Spanish on the history of Spanish literature. The classical Spanish drama. Study of the age of Lope de Vega and Calderón. Reading of Lope, *La Estrella de Sevilla;* Calderón, *La Vida es*

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*Omitted 1906-7.

Sueno. 3 hrs., first semester. 3 units. Professor Turrell.

SPANISH 6. Recent Spanish literature, with particular study of the modern drama. Teading of Echegaray, *O Locura o Santitad*, and *El Gran Galeoto;* Larra, *Partir a Tiempo;* Nuñez de Arce, *El Haz de Lena*, Galdó, *Electra*, etc. 3 hrs., second semester. 3 units Professor Turrell.

BUREAU OF MINES AND ASSAYING.

A separate department of the School of Mines under the name of "The Bureau of Mines and Assaying" has been established to receive and work ores, and to make assays and analysis of ores, minerals, mineral waters and petroleum.

In accordance with the act of the Legislature of the Territory, approved March, 1897, and amended in March, 1899, assays of ores and minerals are made for the prospectors and miners of Arizona and for others at fixed rates established by the law, and tabulated below. To meet the requirements of this work a special laboratory building of brick has been erected and maintained. It is fitted up as a complete assay office and is provided with a large double brick coke-furnace, a melting furnace and gasoline furnaces in a fire-proof room. There are in addition, a parting and wet assay room. a balance room and offices.

Extreme accuracy and excellence of work are considered of more importance than pecuniary profits. All assays are made in duplicate and if not accordant are repeated. A special expert assayer is employed, and the assays are not made by students, who receive their instruction in the regular laboratories of the University

The money received for assaying is deposited monthly to the credit of the assay fund, which is used to pay the assayer and the cost of materials and apparatus.

Rates for Assaying and Chemical Determination.

COMMON ASSAYS AND CHEMICAL DETERMINATIONS.

One element only:	
Gold, or silver, or copper, or lead, or iron, or insoluble,	$ 1 00
Zinc, or calcium, or magnesium, or sulphur or manganese	1 50
Silican or chlorine	2 00
Combinations:	
Gold and silver,	1 00
Copper and iron, or lead or iron	1 50
Insoluble, copper, and lead	2 00
Insoluble, copper, and iron	2 00
Insoluble, lead, and iron	2 00
Insoluble, zinc, and iron	2 50
Insoluble, lead, copper, and iron	2 50
Gold, silver, copper. and lead	2 50
Gold, silver, copper, iron, and insoluble	2 50

SPECIAL CHEMICAL DETERMINATIONS.

One element only:	
Aluminum, or tungsten, or barium, or chromium	3 00
Cadmium, or tin, or arsenic, or bismuth or antimony, or titanium, or sodium, or potassium, or uranium, or phosphorus	4 00
Nickel, or cobalt, or molybdenum, or vanadium	5 00

CHEMICAL ANALYSES.

Coal and coke analysis, giving moisture, volatile combustible matter, fixed carbon and ash	5 00

The same, including determination of sulphur and phosphorus	7 50
Silicate analysis	15 00
Cement analysis (chemical)	15 00
Cement analysis (mechanical)	2 50
Cement tests (strength and soundness, by the Department of Civil Engineering)	3 00
Boiler water analysis	10 00

Rates for Testing of Ores.

Stamp Mill Amalgamation, including sampling, assays, retorting, etc.:

For lots of one ton or thereabouts	$30 00
The same, with concentration of pulp on Wilfley table	30 00
For lots of two tons, without concentration	40 00
For lots of two tons, with concentration	45 00

Smaller Amalgamation Tests, including all sampling charges, and concentrating after amalgamation:

For small samples up to five pounds	$ 7 00
For small samples, five to twenty-five pounds	10 00
For small samples, twenty to one hundred pounds	15 00

In these smaller tests, the sample is ground to pass a suitable mesh, and is agitated with mercury. The mercury is panned out, retorted, and the values determined in bullion. The values in the concentrates and tailings are also determined. The number of tests necessary to determine the adaptability of any ore to treatment by cyaniding varies so greatly that no general rates can be offered.

Consignments, Remittances, Etc.

Samples, ores, and other consignments should be shipped to the University of Arizona, the School of Mines, Tucson, Arizona. Small quantities may best be sent by mail, at the rate of one cent per ounce; larger quantities by express or by freight. The Wells-Fargo Express Company makes daily deliveries at the University.

All assays, chemical determinations and chemical analyses, except gratuitous qualitative tents mentioned elsewhere, must be paid for in advance.

No determination of any kind will be made until the required payment arrives. Remittances should be made by post-office money order, Wells-Fargo money order, bank draft, or check on a Tucson bank, payable to K. C. Babcock, President, University of Arizona, to whom also business communications relating to matters discussed in this circular should be addressed.

THE AGRICULTURAL EXPERIMENT STATION STAFF.

Kendric Charles Babcock, Ph. D. President of the University
Robert H. Forbes, M. S. - - Director and Chemist
John James Thornber, A. M. - - - - - - Botanist
*Vinton A. Clark, B. S. - - - Agriculturist and Horticulturist.
Albert Earle Vinson, Ph. D. - Associate Chemist
Frederick W. Wilson, B. S. - Animal Husbandman
George E. P. Smith, C. E. - - Irrigation Engineer
William B. McCallum, Ph. D. - Assistant Botanist
Edward E. Free, B. S. - - - - Assistant Chemist
T. D. A. Cockrell, - - - Consulting Entomologist
James C. Casselman, - - - - - - - - - - - Clerk

ORGANIZATION AND WORK.

The Agricultural Experiment Station is a legally constituted department of the University, whose purpose is to "aid in acquiring and diffusing * * * useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and applications of agricultural science."

With the above objects in view, the organization of the station includes the departments of administration,

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*Resigned May 1, 1907.

agriculture and horticulture, animal husbandry, botany, and chemistry, the whole or a major portion of the time of one or more members of the station staff being deing devoted to each department of the station work. Provision is made for meteorological work also, though to a less degree.

Owing to the wide variation in agricultural conditions in Arizona, it has been found of advantage to distribute the work so that each department is located, so far as possible, in that region most favorable to the accomplishment of its own special results. According to this principle, the various lines of Experiment Station work have been distributed as follows:

The Director's office and the departments of Botany and Chemistry are maintained at Tucson in the University buildings. Through this arrangement the Experiment Station profits by the buildings and libraries of the University,while the University is benefitted from time to time by the teaching ability of members of the Station staff. It has been found that from this base of operations the three great agricultural districts of the Territory—Salt River valley, the lower Colorado and the upper Gila—are accessible with equal convenience for field work and observations.

On the same ground—fitness of location for the work undertaken—the Experiment Station farm has been maintained and strengthened at Phoenix. Salt River Valley is intermediate in elevation, in situation, and in mean yearly temperature between the other two important farming districts above mentioned, and for this reason the agricultural and horticultural results obtained there are capable of the most general application in the Territory at large.

On the same principle again, the date palm orchard, conducted in co-operation with the United States Department of Agriculture, is located in the alkaline district south of Tempe, where a successful demonstration of this palm as a commercial fruit producer will be of the greatest value, creating use for great areas of alkaline land in the arid southwest. Another orchard has just been planted on a tract near Yuma.

The range station also, for the study of worn-out range country with a view to its reclamation to usefulness, is located in a typical district near Tucson, and is conducted under the auspices of the department of botany, co-operating with the United States Department of Agriculture.

The services of specialists in various subjects, such as entomology, meteorology, and soil survey work, have also been secured from time to time.

The results of the Experiment Station work are made public at frequent intervals in the bulletins and reports of the Station. These publications are made in two series: First, the longer and more technical bulletins, stating in considerable detail the investigations as they mature; and, secondly, the "Timely Hints for Farmers," which are brief writings issued at the time when they will be most useful, written in plain language, and presented in popular form. The annual reports, also, are for the most part written popularly, and afford a convenient and reliable summary of each year's work as it comes to completion.

The Experiment Station work conducted and published on the lines indicated above has a two-fold value. In the first place the suggestions made or derived from the investigations of the Station are of direct material profit to the agricultural public and are intended to be immediately applied to advantage in the betterment of agricultural practice. In the second place, these writings are intended to serve an educational purpose, inasmuch as they are so presented as to constitute lesson sheets for the benefit of the careful reader. It may, therefore, be considered that the Experiment Station reaches a class of some thirty-five hundred readers in the Southwest at frequeut intervals by means of its "Timely Hints" and other publications. The operations of the range study tract at Tucson, the Experiment Station farm at Phoenix, and the date palm orchards at Tempe and Yuma serve also as an object lesson to the adjacent public.

It is believed that this distributed and mobile organization is especially effective, not only for the purposes of the Experiment Station, but also for those of the University as well, since it allows the station to conduct its work in localities suitable for the accomplisement of results; and, again, it causes the public to become better acquainted with the Territorial University, of which the Station is a department.

An appropriation of eleven thousand dollars, made for the use of the Station by the Twenty-second Legislature, very satisfactorily attests the estimation in which the work of the Station is held. The appropriation is intended for the improvement of the date orchard; for purchasing live stock and buildings for the farm; for issuing publications, and for holding farmers' institutes and short courses of instruction throughout the Territory.

Provision, therefore, is made for the symmetrical development of this work in the Territory, both experimentally and educationally; and, prospectively, "the farmers' college" bids fair to increase in usefulness to the growing agricultural interests of the Territory.

PREPARATORY DEPARTMENT.

KENDRIC CHARLES BABCOCK, Ph. D., President, Civics.
SIDNEY CARLETON NEWSOM, A. M., Acting Principal.

INSTRUCTORS.

CHARLES ALFRED TURRELL, A. M., French, German, Spanish.
WILLIAM WHEELER HENLEY, A. B., Shopwork and Drawing.
LIEUT. SAMUEL V. MCCLURE. Military Science and Tactics.
WILLIAM GEORGE MEDCRAFT, A. M., Mathematics.
ANDREW ELLICOTT DOUGLAS, A. B., Science.
A. MAY ASHWORTH, A. B., English.
LEVONA PAYNE NEWSON, Ph. D., Latin.
VICTOR LIGDA, B. S., Physical Training and French.
ESTELLE G. LUTRELL, A. B., English.
RAYMOND C. BENNER, M. S., Chemistry.
FREDERICK E. TALMAGE, B. L., Bookkeeping, Stenography, Typewriting.
OPAL I. TILLMAN, B. S., Domestic Science.
IDA C. REID, B. Ph., Mathematics and History.
MRS. M. HOCHDERFFER, A. B., Spanish.

GENERAL INFORMATION.

In this department the University offers the work of a well-organized, four-years high school, with the added advantages of shopwork and drawing and of domestic science. The general library and gymnasium are open to all students in this department.

The equipment of the scientific laboratories is available for use in this preparatory work, whenever it can be used advantageously, and makes possible strong work in elementary science. The instructors in this department are assisted by the professors of the college departments, several of whom regularly conduct preparatory classes. By reference to the course of study which follows, it will be seen that it offers a comprehensive training for those who may not be able to pursue their studies farther, while it gives a good preparation for college.

ADMISSION.

Admission to regular standing in the first year of the preparatory course presupposes the completion of the work of the eighth grade of the public or parochial schools. Students who do not bring certificates showing the completion of this work, must take examination to test their ability to pursue profitably the work of the first year.

The Board of Regents on April 10th, 1906, voted that after September 1, 1906, no pupils who have not completed the work of the ninth grade (or the first year of a high school) will be admitted into the University from cities in Arizona having more than 5,000 population.

All students entering the preparatory department will be required to take an examination in oral reading. To remedy notable deficiency in this subject, the University will require extra work in addition to other studies.

In all cases in which the preparation of a student in a particular subject proves to be deficient, the University reserves the right to require the student to secure at his own expense the help of an approved coach until the deficiency is remedied.

COURSE OF STUDY.

The following course of study will be required of all students who fit themselves at the University for entrance to the Freshman class in 1907. Such variations from it will be made during the next year as will adapt it to the case of students already in the sub-collegiate department who took part of their work under the former requirements.

Military drill is required of all able-bodied male students throughout the course. Physical training is required of all students, unless they are excused by the President upon presenting a certificate from one of the University physicians. The young men have drill three times per week and exercise in the Gymnasium twice. The young women have physical culture three times a week.

The language begun in the second or third year must be pursued for at least two years in order to secure credit towards graduation.

Though the subjects are for convenience grouped by years in the following schedule, the departmental method is followed. In the description of courses, the subjects are arranged by groups or departments in the consecutive order in which they are taken up and students will be required to take them in this order. Aside from this sequence the ability of each student must determine what subjects will be pursued at any given time, due regard to be given to the proper balance of subjects. The wishes of parents will always be given careful consideration in making up the schedule of work for each student, but the final decision in the matter must rest with the committee on registration, which is composed of persons who have had long experience in secondary and collegiate teaching. Individual attention will be given to the needs of each student.

To each student who completes the studies of this course receiving a total of sixteen units (a unit representing a subject pursued for one year with five, or four, recitation periods per week), a certificate stating that fact will be given.

This certificate will entitle the holder to admittance to the corresponding University courses of instruction without examination.

FIRST YEAR.

(The figures represent recitations per week.)

English	5	Physical Geography	3
Algebra	5	Drawing and shop work, or Domestic Science	5
Greek and Roman History	3		

SECOND YEAR.

English	5	*French (first year)	5
Algebra	5	*Spanish (first year)	5
European History	5	*Drawing and shop work, or Domestic Science	5
*Latin (first year)	5	*Bookkeeping (7 hours)	5
*German (first year)	5		

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*Subjects thus marked are elective. One elective must be chosen in the second year. In the third year and in the fourth year, electives making up at least nine hours must be chosen.

THIRD YEAR.

English	5
Plane Geometry	5
*Chemistry	5
*Latin (second year)	5
*Greek (first year)	5
*French (first year	5
*French (second year)	5
*German (first year)	5
*German (second year)	5
*Spanish (first year)	5
*Spanish (second year)	5
*Stenography	5

FOURTH YEAR.

English	5
American History and Civics	5
*SolidGeometry(first half)	4
*Trigonometry(s'c'd half)	5
*Physics	5
*Latin (third year)	4
*Greek (second year)	5
*French " "	5
*German " "	5
*Spanish " "	5
*Parliamentary Practice	1

ENGLISH.

The English of the preparatory course is based upon what is known as the entrance requirements of New England colleges. The work is in general divided into three parts: Classics, studied in class, composition and grammar work done partly in class and partly outside, and supplementary reading done largely outside the class room. All these parts of the work may be carried on at the same time, as the circumstances of the class seem to require, the classics and supplementary reading forming the basis of a large part of the work in grammar and composition. Throughout the course, however, a primary aim is to develop the student's individual power of

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*Subjects thus marked are elective. One elective must be chosen in the second year. In the third year and in the fourth year, electives making up at least nine hours must be chosen.

expressing himself in words. The time allotted to these three phases of English varies from year to year, increasing attention being paid to the appreciative and critical faculty as the course advances. In the fourth year a brief outline history of English and American literature occupies about one-third of the year's work in English.

Five hours each week throughout the course are given to English. According to the following general outline selections from the list below are made at the discretion of the teacher, preference being given to the New England College Entrance Requirements, which are marked by an asterisk*.

FIRST YEAR.

ENGLISH GRAMMAR AND COMPOSITION receive one-half of the time of the first year.

CLASSICS. Longfellow's Tales of a Wayside Inn, Bryant's Water Fowl, Planting of the Apple Tree, Forest Home, the Antiquity of Freedom, Lowell's shorter poems, Tennyson's Enoch Arden, Miller's Daughter.

SUPPLEMENTARY READING. Talisman, Tom Brown at Rugby, Last of the Mohicans, The Sketch Book, The Man Without a Country, The House of Seven Gables, *Ivanhoe.

SECOND YEAR.

COMPOSITION AND GRAMMAR. As in first year with attention to figures of speech, reproducing the work of classic authors, elementary etymology, exercises in exposition, narration and description.

CLASSICS. *The Vision of Sir Launfal, *The Ancient Mariner. The Ballad Book (Bates), Sohrab and Rustum and *The Idylls of the King, studied as in first year.

SUPPLEMENTARY READING. Deserted Village, Lorna Doone, Tale of Two Cities, Life of Goldsmith, Quentin Durward, The Cricket on the Hearth.

THIRD YEAR.

Composition and Rhetoric are continued with emphasis on elementary argumentation and exposition.

CLASSICS. Julius Caesar, *The Merchant of Venice, The Princess, *Sir Roger de Coverly, Poems of Burns, Carlyle's Essay on Burns. These are for general reading as in the first and second years. For careful reading are the following: *Milton's L'Allegro, Il Penseroso, Comus, Lycidas; *Macauley's Essay on Milton. Special attention will be given to the author, his times and surroundings, and his style.

SUPPLEMENTARY READING. Sesame and Lilies, Backlog Studies, Treasure Island, Kidnapped, Silas Marner, Alhambra.

FOURTH YEAR.

COMPOSITION AND GRAMMAR. Exercises in narration and description for flexibility and ease of expression and general preparation for entrance requirement "b" on page 41 of this register.

CLASSICS. *Burke's Speech on Conciliation, Macaulay's *Life of Johnson, Essay on Addison, *Macbeth, The Tempest, Midsummer Night's Dream. These are all for thorough study.

HISTORY OF ENGLISH LITERATURE. From the earliest times, with text-book as guide, with a review in chronological order of the classics studied during the

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*Subjects thus marked are elective. One elective must be chosen in the second year. In the third year and in the fourth year, electives making up at least nine hours must be chosen.

four years of the course, to prepare for examination in entrance requirement "a" on page 40 of this register. Special attention is paid to Keats, Shelley, Tennyson and other representative poets of the nineteenth century.

SUPPLEMENTARY READING. *Vicar of Wakefield, The Making of an American, The Newcomes, Oliver Twist, American Orations and Addresses.

MATHEMATICS.

FIRST YEAR.

ALGEBRA. Introduction, factoring, fractions, simple equations, simultaneous equations, and special problems.

SECOND YEAR.

ALGEBRA. Involution, evolution, theory of exponents, radicals, quadratic equations, and proportion.

After 1907 but two years will be devoted to preparatory algebra. The two years' work will be required for entrance.

THIRD YEAR.

Plane geometry, including thorough work in original exercises.

FOURTH YEAR.

First semester, solid geometry with original exercises. Second semester, plane and spherical trigonometry.

MECHANIC ARTS.

This work consists of both drawing and shop work, between which subjects the student's time is about equally divided. The course covers two years and is designed to furnish a thorough elementary knowledge of manual training as taught in the secondary schools of the country.

FIRST YEAR. Drawing—Freehand sketching in perspective and orthographic projection. Reinhart's lettering, free-hand working drawings.

Shop work—"Sloyd," care and use of woodworking tools.

SECOND YEAR. Drawing—Mechanical drawing and geometrical problems.

Shop work—Forging, joinery, wood-turning.

SCIENCE.

It is the object of the courses in sience to initiate the student into the processes and methods used in laboratory work; to teach close observation, careful manipulation and logical deduction; to acquaint the student with the fundamental facts of the various branches of science and to give full practice in the use of good English in describing various observations and experiments. To insure better results in the notebooks, they will all be passed upon by one of the instructors in English.

PHYSICAL GEOGRAPHY—This course, combining the laboratory method with the text-book, aims to give the pupils training in exact observation of familiar phenomena, like distance, weight, pressure of liquids and gases, temperature, winds, clouds and the habits of plants and animals. The natural forces producing erosion, formation of soils and rocks, the processes of nature as seen in seed germination and plant growth (with demonstrations with the microscope) will be discussed, with frequent experiments and field excursions. The entire country within reach of the University is a great natural laboratory, full of interest and information for all. The course explains these features which become so familiar to everyone residing here.

CHEMISTRY. A year's work with the text and in the laboratory, in such proportions as the instructor decides upon. Each student must keep a note-book in which he describes the process and results of his laboratory work.

PHYSICS. The course aims to show that physics is not something abstract or mysterious, but is the simple explanation of everyday occurrences not usually understood and often unnoticed. It consists of three recitation periods and four laboratory periods per week, carried on along the lines laid down for the senior year in secondary schools. Each student must keep a note-book in which a minimum number of experiments must be written up.

DOMESTIC SCIENCE.

The course in domestic science for young women is arranged to give instruction in the science and art of home economics, and to raise home making to a higher plane.

SEWING. The making of laboratory uniforms, plain undergarments and dresses, with talks on materials and implements used; use of machine with simple attachments. Three periods per week through the year.

COOKING. Practical work in the preparation of food, with study of the food principles and the effect of heat upon each proper combination in a well-balanced diet. Two periods per week through the year.

HISTORY.

The aim of the work in history is to lead the pupil to see the development of races and nations along political, social and religious lines, and to arouse in him a love for the subject and a habit of broad and discriminating reading.

The work of the first year consists of a survey of the development and characteristics of the Greek and Roman civilizations. A text such as Wolfson, *Essentials of Ancient History*, or West, *Ancient History*, will be supplemented by collateral reading and a note-book.

The work of the second year includes mediaeval and modern history. The aim is to give the students an idea of the essential unity of history and the leading facts in the political development of races and nations. Harding, *Essentials of Mediaeval and Modern History*, is used, supplemented by the reading of references contained therein.

Hart, *Actual Government*, is the text-book in civics. The historical development of the subject is made prominent while practical problems, such as taxation and municipal government, are made the subjects of special investigation and study. Beginning with September, 1907, the work in civics will be combined with the history of the United States, making a full subject, five times a week. The text in history will be Channing, *Student's History of the United States*.

LATIN, GREEK, FRENCH, GERMAN AND SPANISH.

For an outline of the courses in Latin and Greek see page 40, under requirements for admission.

For an outline of the courses in French, Spanish and German see pages 61, 81, 63.

BOOKKEEPING AND COMMERCIAL PRACTICE.

Bookkeeping is taught by the modern budget system. The work is individual and each student may progress as fast as his time and ability permit. The course is thorough in all the details of office practice. Students are made familiar with different filing cabinets, the filing of letters, the use of card ledgers, the copying and indexing of letters and bills in copy books. The course includes instruction in commercial law, with special emphasis laid on the ordinary forms of commercial paper and the different endorsements. The department is equipped with the latest vertical files, cabinets, letter press and office sundries. All students in bookkeeping are required to take some other branch of mathematics and must show proficiency in English.

STENOGRAPHY AND TYPEWRITING.

A complete course in stenography is offered. The Gallagher-Marsh system, a system which has received the highest endorsement of leading court reporters on the Pacific coast, and which has been adopted by the Boards of Education in the largest cities of California, has recently been adopted. The amount of time allotted for this work has also been increased from five hours to eight hours per week. The object of the course is to train students so that they may become practical stenographers. With this end in view particular stress is laid upon neatness, filing, copying and indexing. This branch of the commercial department is equipped with up-to-date filing cases, office sundries, and six typewriters, four of which are Remingtons, one an Oliver and one the L. G. Smith Visible. Five of the typewriters are new. Students taking this work are required to have had one year in English, and to take English with this course.

ALUMNI ASSOCIATION.

The Alumni Association of the University of Arizona was organized on the second day of June, 1897.

The object as expressed in its constitution is: "To promote the interests of the University, to secure unity among its graduates and to foster an attachment to our Alma Mater."

Concerning the last two clauses of this declaration it may be said that the organization is carrying out its meaning in a manner which leaves little, if anything, to be desired. There is no doubt regarding the loyalty of the graduates to the University of Arizona and no question of their unanimous desire for the prosperity of the institution.

The first clause of the above declaration, however, deals with a matter which in a sense admits of more growth than those just mentioned, and the members of the association realize that there is room for further progress in the accomplishment of this purpose.

It will be the aim of the alumni association to create a deeper feeling of interest and pride in the University of Arizona among the people of the Territory.

1895.

*Charles Oma Rouse, B. S.

Mercedes Anna Shibell, B. S., [Mrs. A. J. Gould], Tucson, Arizona.

Mary Flint Walker, B. S., [Mrs. Pearl Adams], Benson, Arizona.

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*Died, 1906.

1897.

Edward Marshall Boggs, C. E., [nunc pro tunc], Chief Engineer Oakland Electric Railways, Oakland, Cal.

Clara Cramond Fish, B. S.. [Mrs. F. C. Roberts], Phoenix, Arizona.

George Ojeda Hilzinger, B. S., Teller in Bank, El Paso, Texas.

Mark Walker, B. S., Metallurgist, Tombstone, Arizona.

1898.

Hattie Ferrin, B. S., [Mrs. Charles Solomon], Solomonville, Arizona.

Granville Malcolm Gillett, B. S., Draughtsman in Surveyor General's Office, Phoenix, Arizona.

Minnie Watts, B. S., [Mrs. W. B. Smith], Altaville, California.

*John Desha Young, B. S.

1899.

Robert L. Morton, B. S., Assayer, Yuma, Arizona.

1900.

Ida Clarissa Flood, B. S., [Mrs. G. Dodge], Oakland, California.

Samuel Pressly McCrea, B. S., A. B., Principal of High School, Redwood City, California.

Charles Pierce Richmond, B. S., Cyanide Manager, La Union, Salvador, Central America.

Florence Russell Welles, B. S., [Mrs. Wm. Angus], Los Angeles, California.

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*Died April 8, 1899.

1901.

Rudolph Castaneda, B. S., Surveyor, Tucson, Arizona.

Clara Ferrin, B. S., Teacher, Tucson, Arizona.

George Millard Parker, B. S., Denver, Colorado.

David Hull Homes, B. S., [nunc pro tunc], Professor of Drawing, University of Arizona, Tucson, Arizons.

1902.

Andrew Gilbert Aiken, A. B., B. S., Surveyor, Canton, New York.

Moses Blumenkranz, B. S., Assistant Superintendent Shannon Copper Company, Metcalf, Arizona.

Ruth Brown, Ph. B., [Mrs. Wilkins Manning], Tucson, Arizona.

Felix Grundy Haynes, B. S., Casa Grande, Arizona.

Rose Belle Parrott, Ph. B., Teacher, Roseburg, Oregon.

Philip Matthew Reilly, B. S., Mining Superintendent, Campas, Sonora, Mexico.

Bertram L. Smith, B. S., Assayer, Silver Bell, Arizona.

Bessie Smith, Ph. B., [Mrs. Earle Davis], Tombstone, Arizona.

Walter James Wakefield, Assayer, Tucson, Arizona.

1903.

Advanced Degrees:

Hon. William Herring, LL. D., Tucson, Arizona.

John William Gorby, B. A., [Marietta], M. A., teacher, Chicago, Illinois.

Benjamin Franklin Stacey, [B. A., B. D., Lombard], M. A., Teacher, Pasadena, California.

Richard Lamar Drane, B. S., Chief Draughtsman, G. V., G. & N. Ry., Tucson, Arizona.

George Mark Evans, [LL. B., Michigan], Ph. B., Teacher, Santa Ana, California.

Leslie Alexander Gillett, B. S. [Mining], Draughtsman, Surveyor General's Office, Phoenix, Arizona.

Georgia Ann Holmesley, Ph. B., Teacher, Clifton, Arizona.

Edward Horton Jones, B. S., Assayer, Magdalena, Sonora, Mexico.

John Williard Prout, Jr., B. S., Superintendent Mowry Mine, Patagonia, Arizona.

Thomas Edward Steele, B. S., Assayer, La Cananea, Sonora, Mexico.

1904.

William Burnham Alexander, B. S., Civil Engineer, Tucson, Arizona.

Elbert John Hollingshead [Kimble], B. S., Los Angeles, California.

Frank Caleb Kelton, B. S., Civil Engineer, Tucson, Arizona.

Estella Markham Prout, Ph. B., Denver, Colorado.

John Williard Prout, Jr., B. S. [Mining]. See 1903.

1905.

Ora Elinor Norway, Ph. B., Patton, California.

1906.

Advanced degree:

William B. Begg, A. B. [Toronto], M. S.

Chester Bennett Clegg, B. S. [Civil Engineering], Draughtsman, Roosevelt, Arizona.

John Wesley Gebb, B. S. [Mining], Tucson, Arizona.

Roy Bartley Kilgore, B. S. [Mining], Seattle, Washington.

Roy Gibbons Mead, B. S. [Mining], Mining Superintendent, Ray, Arizona.

Roy Webb Moore, B. S. [Mining], Campus, Mexico.

Carobel Murphey, A. B. [Cox College], Ph. B., Student, Smith College, Northampton, Massachusetts.

Ida Christian Reid, Ph. B., Instructor, University of Arizona, Tucson, Arizona.

Minnie Louise Wooddell, Ph. B., Teacher, Tucson, Arizona.

MILITARY ORGANIZATION 1906-7.

UNIVERSITY OF ARIZONA CADET BATTALION.

NATIONAL GUARD OF ARIZONA.

Commandmant of Cadets...
Lieutenant Samuel V. McClure, U. S. A.; Major, N. G. A.

STAFF.

Adjutant	First Lieutenant George W. Kohler
Sergeant Major	Frank W. Rose

COMPANY A.

Captain	Albert R. Buehman
First Lieutenant	Warren A. Grosetta
Acting Second Lieutenant	John H. Culin
First Sergeant	Rollin Brown
Sergeant	Charles A. Button
Sergeant	Lawrence A. Calloway
Corporal	Ernest O. Blades
Corporal	Charles A. Firth

COMPANY B. (COLOR COMPANY.)

Captain	Andrew P. Martin
First Lieutenant	Leslie C. Miller
Second Lieutenant	Lynne F. Hazzard
First Sergeant	Leon H. Strong
Sergeant	Norman A. Rose
Sergeant	J. Malcolm Henry
Corporal	J. Urbano Salazar
Corporal	H. Oliver Coles

TRUMPETERS.

Sergeant	Alex. G. Lulley
Corporal	Sidney F. Mashbir
Private	Frank M. Cannon
Private	Joe Peggs
Private	C. Wendell Kuencer

COLOR GUARD.

Color Sergeant	Howard W. Estill
Acting Color Sergeant	Alvan C. Gillem, Jr.
Corporal	Benjamin F. Clark
Corporal	G. Kemper Mason

At the annual Military Competitive Drill, June 5, 1906, Company B, then commanded by Capt. Buehman, won the honor of carrying the colors for the next year, and Cadet Rollin Brown won the University medal in the individual competition.

REGISTER OF STUDENTS.

1906-7.

GRADUATE STUDENTS.

Ashworth. A. May, A. B. (Smith), French	Tucson
Packer, Florence Eastman, (Smith), Spanish	Malden, Mass.
Schaffelberger, Mrs. G. E., A. B. (Nebraska), Spanish	Tucson

SENIORS.

Alexander, Charles	Tempe
Brown, Harriet Estella	Tucson
Croasdale, Lawrence Brodhead	Delaware Water Gap, Pa.
Purcell, Weda Ina	Tucson
Wolflin, Hugh Maupin	Tucson

JUNIORS.

Barthels, Frederick	San Francisco, Cal.
Chapin, Theodore	Flagstaff
Holbrook, Horace Rollin	Yreka, Cal.
Mellgren, Walter Give	Tombstone
Murphey, Robert Bivins	Tucson
Tarr, William Arthur	Tucson
Vrooman, John Jacob	Schenectady, N. Y.

SOPHOMORES.

Birkner, Hugo Ernest	Lincoln, Neb.
Bradstreet, Carroll Pitkin	New York City
Buehman, Albert Rex	Tucson

Dane, Harry Chase, A. B. (Occidental)	Los Angeles, Cal.
Dinsmore, Benjamin Scott	Parnassus Pa.
Drew, William Franklin	Mesa
Edwardes, Vance Philipps	Berkeley, Cal.
Harwick, Ralph N.	Buffalo, N. Y.
Hatcher, Burrell R.	Douglass
La Baree, Grace Ysabel	Tucson
Newton, Raymond Austin	Patchogue, N. Y.
Ruthrauff, John Mosheim	Tucson
Thompson, Arthur Perry	Tucson
Washington, Herbert A.	Schenectady, N. Y.
Wilkerson, Mabel	Yuma

FRESHMEN.

Barker, Norman M.	Imuris, Mexico
Blades, Ernest Orrin	Roosevelt
Calloway, Lawrence Arthur	Tucson
Clark, Ewing	Tucson
Doan, Fletcher Morris, Jr.	Tombstone
Ekey, Alice Bertha	Salina, Kan.
Engle, John Jacob	Buffalo, N. Y.
Grossetta, Warren Arthur	Tucson
Hazzard, Lynne Franklin	Bisbee
Henley, Louise	Davenport, Ia.
Hoyt, Joseph Clyde	Jerome
Jones, Percy Wonson	Christmas
Kohler. George William	Tucson
Martin, Andrew Philip	Tucson
Nash, Willard Henry	Buffalo, N. Y.
O'Connell, Thomas Sarsfield (2d semester)	Tucson
Post, Anita Calneh	Yuma
Rebstock, Duane	Phoenix

UNCLASSIFIED—COLLEGE.

Allen, Eloise Mildred—History........................Tucson
Blackwood, Mrs. Evelyn—English, Economics.....Bisbee
Brady, Margaret Anna—History....................Tucson
Briggs, Susan—English, Stenography...............Tucson
Clingan, Bernal Herbert—Chemistry, History.....Tucson
Cocke, Charles Lewis—English, History, Economics..Roanoke, Va.
Crable, Francis Drake—Chemistry, Geology, Mineralogy..Tombstone
Culley, Edith Emily—Pedagogy..................Tucson
Goodin, Frances Earle—History....................Tucson
Gould, Joseph L.—Geology, Civil Engineering, Chemistry..Bisbee
Hochderffer, George—Botany.......................Flagstaff
Hochderffer, Mary J.—Botany.......................Flagstaff
Hooper, Ethel A.—Spanish....................Berkeley, Cal.
Mitchell, J. Henry—English, Economics, Spanish, ...Cananea, Mex.
Morrison, Elizabeth S.—History, French, Spanish, ...Chicago
Olson, Charles Henry—Spanish...........San Pedro, Cal.
Roberts, Dorothea—English...............Hartford, Conn.
Rogers, Mrs. Annie—History, Botany................Tucson
Scow, Oliver—Civil Engineering, Physics....Dos Cabezas
Spires, Alice—History..................................Tucson
Tarr, Carolyn G.—English, Botany, Spanish.....Tucson
Wren, Ina May—Spanish, English.....................Tucson
Wright, William Edward—Latin, Philosophy......Tucson
Payne, Lena Hartsfield—Spanish, English, Stenography..Tucson
Pease, Ione Gertrude—English, Economics........Tucson

FOURTH PREPARATORY.

Ballinger, Hugh Hutchinson	Tucson
Drachman, Myrtle Augustine	Tucson
Duffy, Mary Margaret	Tucson
Elliott, Irene	Tucson
Elliott, Gordon	Clifton
Goldtree, Estella Esther	Tucson
Leslie, Beppie	Tucson
Lulley, Alex Gray	Nogales
Millar, Leslie Creighton	Tucson
Murphey, Elizabeth Ella	Tucson
Purcell, Ivy Mae	Tucson
Ratliffe, George T.	Wichita
Rider, Jane Herbst	Tucson
Rose, Frank Winfred	Livingston
Rose, Norman Allan	Livingston
Ryder, Frank	Tucson
Sine, Eva Jessie	Tucson
Steele, Willard Penn	Mansfield, O.
Strong, Leon Henri	Tucson
Temm, Edward Byrne	Tucson

THIRD PREPARATORY.

Angius, John	Bisbee
Batte, Benjamin Homer	Tucson
Beck, Charlotte Ellen	Tucson
Bennie, Florence Mary	Clifton
Brown, Kenneth Brooke	Tucson
Brown, Marguerita Bernice	Tucson
Brown, Rollin	Tucson
Button, Charles Aca	Williams
Carpenter, Leslie Lucile	Tucson
Coles, Henry Oliver	Bisbee

Corda, Mamie Wilhelmina	Tucson
Culin, John Harding	Tucson
Dannemiller, Charles Raymond	McCabe
Decker, Hazel	Tucson
Duffy, Alice Elizabeth	Tucson
Duffy, Harriet Loretta	Tucson
Edgerton, Ambrose Earl	Cananea, Mex.
Emmons, Thomas Guy	Pearce
Estill, Howard Wilmot	Tucson
Firth, Charles Abraham	Aravaipa
Galindo, Edwin Arthur	Tucson
Huddleston, Julian	Tucson
Kohler, Barbara	Tucson
Long, Robert Kistner	Tucson
McNeil, Clara May	Tucson
Mashbir, Sidney Freudenthal	Safford
Maverick, Reuben	San Antonio, Texas
Millar, Edward B.	Tucson
Nielsen, Gwynne Eleanor	Tucson
Nisihihara, George	Tucson
Pritchard, Stella M.	Tucson
Purcell, Marie E.	Tucson
Pusch, Henrietta	Tucson
Simonds, Marie Theresa	Hermosillo, Mex.
Sine, Janet	Tucson
Smith, Felicia	Globe
Trippel, Amy Irene	Tucson
Weeks, Raymond Jackson	San Carlos
White, Edwin Henry	Cochise
Whitwell, Sturges Bigelow	Tucson
Wooddell, Florence Ella	Tucson

SECOND PREPARATORY.

Allison, Josephine	Tucson
Baker, Agnes Mary	Helvetia
Barker, Lawrence Ward	Imuris, Mex.
Bohannon, May S.	Tucson
Campbell, William Riggs	Tucson
Cannon, Frank Mullen	Congress
Christie, Gerald Franklin	Tucson
Clark, Benjamin Harrison	Benson
Cole, Carl Henry	Globe
Estabrook, Florence E.	Tucson
Gillem, Alvan Cullam, Jr.,	Fort Huachuca
Goldring, Abraham	Tucson
Hardicker, Fred Earl	Douglass
Hawke, Viola May	Tucson
Henry, James Malcolm	Tucson
Henry, Lena Beatrice	Tucson
Huddy, Viola Edith	Pearce
Hughes, Mary Annetta	Tucson
Hughes, Wesley Rowland	Tucson
Jones, Mary Virginia	Tucson
Jones, Sidney Raymond	Tucson
Knestric, Emma Frances	Tucson
Lovejoy, Arthur L.	Tucson
McAneny, Evelyn Grace	Cananea, Mex.
McClure, John Clarendon	Tucson
Mason, G. Kemper	San Diego, Cal.
Mobley, Janet Editha	Tucson
Morales, Theresa	Tucson
Morgan, Ethel Rose	Willcox
Pantosky, Rose	St. Helena, Cal.
ch, Wilhelmina	Tucson

Rodgers, Helen	Canaille
Roletti, Charles John, Jr.,	Tucson
Russell, Selina	Tucson
Shaw, Harry Downing	Cananea, Mex.
Smith, Charlotte Ellen	Globe
Soto, Lucretia	Willcox
Williams, Isaac Jackman	Congress Junction
Wooddell, De Leslie	Tucson

FIRST PREPARATORY.

Bennett, Harry Schlitz	Phoenix
Bennett, Jarvis Dant	Maricopa
Bennie, Isobel	Clifton
Brown, Harriet Anna	Tucson
Cappleman, Treasy M	Tucson
Cole, Oscar Campbell	Bisbee
Copeland, Will	Tucson
Davis, Henry George	Willcox
De Corse, Benjamin Franklin	Yuma
Dicus, Ruby Maud	Douglass
Durazo, Pedro	Tucson
Dutton, Charles Allen	Flagstaff
Emmons, Harriet	Pearce
Helsel, Nettie	Tucson
Hoffman, Gladys Beula	Tucson
Jenkins, Alta	Tucson
Kuencer, Charles Wendell	Kingman
Kuencer, Walter Ernst	Kingman
Lemons, Charles Robert	Pearce
Lindsley, R. G.	Tucson
McComb, Richard Raymond	Willcox
McReynolds, Walter B.	Tucson

Nichols, Louise	Tucson
O'Connell, Mildred	Tucson
Peggs, Jo	Rillito
Prewitt, Fletcher Dudley	Bowie
Rodriguez, Richard Garcia	La Colorado, Mex.
Salazar, José Urbano	Chihuahua, Mex.
Soto, Ernest Steve	Willcox
Wien, Mary Theresa	Johnson

UNCLASSIFIED—PREPARATORY.

Bailey, Ella A.—Spanish, Bookkeeping	Tucson
Clark, Mary Ellen—English	Tucson
Farish, Thomas Edward—Chemistry, Algebra, Physics	Phoenix
Foster, George S., Jr.,—Chemistry, Mathematics, Physics	Tucson
Francis, Mary Agnes—Stenography	Tucson
Lord, Alexander—English, Shopwork and Drawing	Lampazos, Mex.
Robles del Campo, José—English, Shopwork and Drawing	
Salgado, Lucio—English, Bookkeeping	Lapaz, Mex.
Scholefield, Helen Mar—Stenography	Tucson
Soto, Lydia—Geometry, Spanish	Willcox
Wien, Gertrude Estelle—English, Bookkeeping	Johnson
Wien, Parthenia—English, Stenography, Bookkeeping	Johnson

SUMMARY.

Graduate Students	3		
Seniors	5		
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Total College		73	
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UNIV. OF MICH.
OCT 22 1909

REGISTER

1907-8

ANNOUNCEMENTS

1908-9

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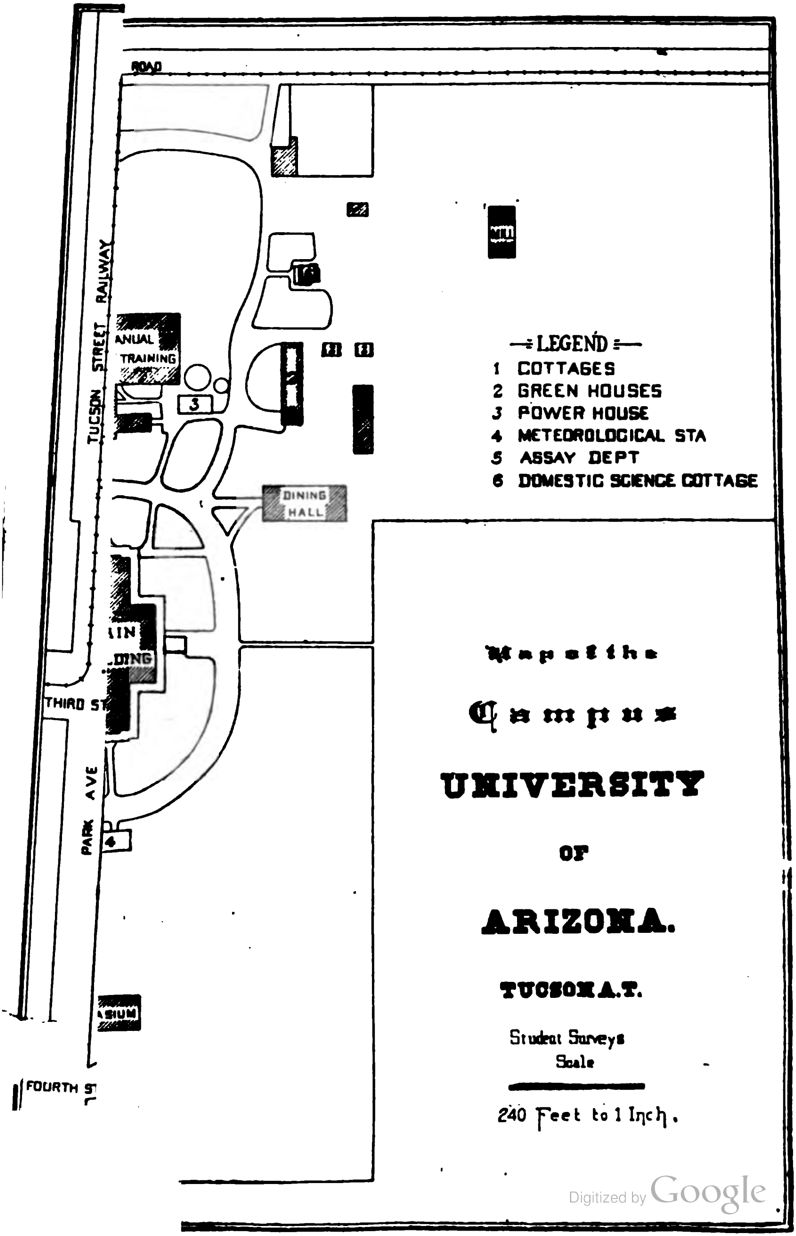
TUCSON, ARIZONA
1908



—LEGEND—

1 COTTAGES
2 GREEN HOUSES
3 POWER HOUSE
4 METEOROLOGICAL STA
5 ASSAY DEPT
6 DOMESTIC SCIENCE COTTAGE

Map of the

Campus

UNIVERSITY

OF

ARIZONA.

TUCSON A.T.

Student Surveys
Scale

240 Feet to 1 Inch.

REGISTER

OF THE

UNIVERSITY OF ARIZONA

SEVENTEENTH YEAR
1907 - 1908

ANNOUNCEMENTS
1908 - 1909

TUCSON, ARIZONA
Citizen Printing and Publishing Co.
1908

CALENDAR.

1908.

Sept. 17, Thursday . . .	Entrance Examinations.
Sept. 18, Friday	Condition Examination.
Sept. 21, Monday . . .	Registration Day.
Sept. 22, Tuesday . . .	First Semester begins.
Nov. 25, Wednesday . .	Thanksgving recess begins.
Nov. 30, Monday . . .	Instruction resumed.
Dec. 23, Wednesday	Holiday recess begins.

1909.

Jan. 4, Monday	Instruction resumed.
Jan. 29, Friday	First Semester ends.
Feb. 1, Monday	Second Semester begins.
May 30, Sunday . . .	Baccalaureate Discourse.
June 1, Monday . . .	Exhibition Military Dept.
June 2, Wednesday . .	Commencement.

BOARD OF REGENTS.

Ex-Officio.

HON. JOSEPH H. KIBBEY....................Phoenix

Governor of the Territory.

HON. R. L. LONG............................Phoenix

Superintendent of Public Instruction.

Appointed by the Governor.

Term expires.

HON. MERRILL P. FREEMAN, Tucson.....August, 1909

Chancellor.

HON. GEORGE J. ROSKRUGE, Tucson.....August, 1909

Secretary.

HON. CHARLES H. BAYLESS, A. M., Tucson.August, 1909

Treasurer.

HON. A. V. GROSSETTA, Tucson........ August, 1911

Regular meetings on the 10th of each month.

FACULTY.

KENDRIC CHARLES BABCOCK, Ph. D.
B. L., 1889, Minnesota; A. M., 1895, Harvard; Ph. D., 1896, Harvard.
President; Professor of History and Economics. 1903.*

WILLIAM PHIPPS BLAKE, A. M.
Ph. B., 1852, Yale; A. M., Dartmouth; D. Sc., 1907, Pennsylvania
Professor of Geology, Emeritus. 1895.

ROBERT HUMPHREY FORBES, M. S.
B. S., 1892, M. S., 1895, University of Illinois.
Director and Chemist, Agricultural Experiment Station. 1894.

†FRANK NELSON GUILD, M. S.
B. S., 1894, M. S., 1903, Vermont.
Professor of Chemistry and Mineralogy. 1897.

GEORGE EDSON PHILIP SMITH, C. E.
B. S., 1897; C. E., 1899, Vermont.
Irrigation Engineer, Agricultural Experiment Station. 1900.

JOHN JAMES THORNBER, A. M.
B. S., South Dakota (Agricultural); B. S., 1897, A. M., 1901, Nebraska.
Professor of Biology; Botanist, Agricultural Experiment Station. 1901.

SAMUEL VICTOR McCLURE
First Lieutenant, U. S. A., 1896, West Point.
Professor of Military Science and Tactics. 1904.

EDWIN MORTIMER BLAKE, Ph. D.
Engineer of Mines, 1890; Ph. D., 1893, Columbia.
Professor of Mathematics and Mechanical Engineering. 1904.

---

*Dates following titles indicate appointment to service in the University.

†Leave of absence, 1908-9.

SIDNEY CARLETON NEWSOM, A. M.
A. B., 1895, Harvard; A. M., 1898, Chicago.
Professor of English. 1904.

CYRUS FISHER TOLMAN, Jr., B. S.
B. S., 1896, Chicago.
Professor of Geology and Mining Engineering, 1905.

ALBERT EARLE VINSON, Ph. D.
B. S., 1901, Ohio (State); Ph. D., 1905, Goettingen.
Associate Chemist, Agricultural Experiment Station. 1905.

CHARLES ALFRED TURRELL, A. M.
B. S., 1896, Nebraska; A. M., 1901, Missouri.
Professor of Modern Languages. 1904.

LESLIE ABRAM, WATERBURY, C. E.
B. S., 1902; C. E., 1905, Illinios.
Professor of Civil Engineering.

ROBERT RHEA GOODRICH, M. S.
B. S., (Mining), 1885; B. S., (Mechanical Eng.), 1901; M. S., 1902, Mass Inst. Technology.
Professor of Metallurgy. 1907.

ROBERT WAITMAN CLOTHIER, M. S.
B. S., 1897; M. S., 1899. Kansas (Agricultural).
Professor of Agriculture and Conductor of Farmers Institutes. 1907.

J. ELIOT COIT, Ph. D.
B. S., North Carolina; M. S,, 1905; Ph D., 1907, Cornell.
Associate Horticulturist, Agricultural Experiment Station. 1907.

WILLIAM WHEELER HENLEY, A. B.
A. B., 1905, Leland Stanford, Jr.
Professor of Mechanic Arts. 1905.

ANDREW ELLICOTT DOUGLASS, A. B.
A. B., 1889, Trinity.
Professor of Physics and Astronomy. 1906.

WILLIAM BURNETT McCALLUM, Ph. D.

B. S. A., 1894, Toronto; Ph. D., 1904, Chicago.

Associate Botanist, Agricultural Experiment Station. 1907.

FREDERICK W. WILSON, B. S.

B. S., 1905, Kansas, (Agricultural.)

Associate Animal Husbandman, Agricultural Experiment Station. 1905.

WILLIAM GEORGE MEDCRAFT, A. M.

A. B., 1898; A. M., 1904, Kansas Wesleyan.

Assistant Professor of Mathematics. 1906.

VICTOR LIDGA, B. S.

B. S., 1904, California.

Assistant Professor of Physical Training and French. 1906.

RAYMOND C. BENNER, M. S.

B. S., 1902, Minnesota; M. S., 1905, Wisconsin.

Assistant Professor of Chemistry. 1906.

MARION CUMMINGS STANLEY, B. L.

B. L., 1900, California.

Instructor in Philosophy. 1902.

ESTELLE LUTRELL, A. B.

A. B., 1896, Chicago.

Instructor in English; Librarian. 1904.

FREDERICK EDWIN TALMAGE, B. L.

B. L., 1903, California.

Instructor in Stenography and Book-keeping. 1904.

LEVONA PAYNE NEWSOM, Ph. D.

A. B., 1892; Ph. D., 1895, Franklin.

Instructor in Latin. 1905.

OPAL IONE TILLMAN, B. S.

B. S., 1905; M. S., 1906, Ohio State.

Instructor in Domestic Science and Botany. 1906.

IDA CHRISTINA REID, Ph. B.
Ph. B., 1906, Arizona.
Instructor in History and Mathematics. 1906.

CHARLES GUY HOOVER
Rochester College (Indiana.)
Instructor in Music.

MARY JOHNSTON HOCHDERFFER
B. A., 1903, Toronto.
Instructor in Modern Languages and English. 1907.

ESTHER EVERETT LAPE, B. A.
B. A., 1905, Wellesley.
Instructor in English. 1907.

FRANK CALEB KELTON, B. S.
B. S., 1904, Arizona.
Instructor in Civil Engineering and Drawing. 1907.

FRANK OSCAR SMITH, LL. B.
B. S., 1905; M. A., LL. B., 1907, Northwestern.
Instructor in History and Economics. 1907.

WILLIAM HORACE ROSS, Ph. D.
B. S., 1903; M. S., 1904, Dalhousie; Ph. D., 1907, Chicago.
Assistant Chemist, Agricultural Experiment Station . 1907.

FREDERICK EDWIN TALMAGE, B. L.
Secretary of the University. 1904.

HERBERT BROWN
Curator Territorial Museum.

LURENA MERRIMAN
Preceptress of Young Women. 1907.

MRS. MARY HENRY AITON, M. D.
M. D. Northwestern.
Medical Examiner for Women. 1905.

ARTHUR W. OLCOTT, M. D.

A. B., 1884, Princeton; M. D., 1887, St. Louis.

Medical Examiner for Men. 1905.

RAYMOND C. BENNER, M. S.

Head of Men's Dormitory. 1907.

WILBUR OLIVER HAYES

Secretary of the Agricultural Experiment Station. 1907.

WALTER M. COLE

Superintendent of Buildings and Grounds. 1907.

RAYMOND C. BENNER, M. S.

Commercial Assayer. 1907.

STUDENT ASSISTANTS.

(Service not continuous through the year in every case.)

H. M. Wolflin
M. M. Carpenter
E. B. Whiting
W. A. Tarr
Burrell R. Hatcher
Theodore Chapin
Frances M. Babcock
Mabel Wilkerson
B. S. Dinsmore
A. Perry Thompson
B. F. De Corse
B. L. Cheney
E. O. Blades
C. G. Standeford
R. Haby
E. Burgess
E. Engle
S. R. Jones
Lawrence A. Calloway
Pauline Rodgers
Anita C. Post
H. Oliver Coles
Frank Cannon
G. T. Ratliffe
F. W. Rose
W. P. Steele
G. S. Foster, Jr.

STANDING COMMITTEES.

1907 1908.

The President is ex-officio member of all committees.

Executive.
Professors Forbes, Tolman, E. M. Blake.

Registration and Classification.
Professors Guild, E. M. Blake, Newsom, Medcraft.

Library.
Professor Guild, Turrell, Miss Lutrell.

Athletics.
Professors Thornber, Douglass, Mr Lidga.

Public Exercises.
Professor Medcraft, Miss Lutrell

Intercollegiate Debate.
Professors Thornber, Newsom.

Manual Training.
Professors Henley, E. M.. Blake, Miss Tillman.

Co-Operative Association.
Mr. Tallmage.

Preparatory Department.
Professors Newsom, Medcraft, Miss Reid.

Rhodes Scholarship.
President Babcock, Professors Newsom, Guild.

UNIVERSITY OF ARIZONA

**Established by Act of the Legislative Assembly, 1885;
Open to Students, October, 1891.**

PURPOSE AND ORGANIZATION.

The University of Arizona is an integral part of the system of public education established by and for the Territory, and aims, as the head of such system, to fill the same position as that occupied by the State universities in such States as California and Wisconsin. Its general organization is in accordance with the Act of Congress of July 2, 1862 known as the Morrill Act, creating the "Land Grant Colleges;" the details of its organization and government are regulated by the Act of the Legislative Assembly of the Territory of Arizona, passed in 1885 and embodied, with amendments, in the Revised Statutes of Arizona Territory, 1901, which vests the government of the institution in a corporation styled the Board of Regents of the University of Arizona, consisting of the Governor and Superintendent of Public Instruction of the Territory, *ex officio,* and four other members appointed by the Governor for a term of four years.

In creating the University, the Legislative Assembly wisely followed the example of the great States of Wisconsin, Illinois, Minnesota, Nebraska, and California, in unifying under one management the various schools and institutions of higher learning or investigation in Arizona,—the colleges of liberal arts, the schools of mines and engineering, the agricultural college, and the agricultural experiment station, which in some States have been widely and completely separated. No professional schools of law, medicine, dentistry, or music have been established. In compliance with the provisions of Act creating it, the University consists of

I. The College of Agriculture and Mechanical Arts.
II. The School of Mines.
III. The Agricultural Experiment Station.
IV. The Preparatory Department.

The Normal Department authorized by the statute has not as yet been organized. The Preparatory Department, which is really a first class manual training high school with a four years course, will gradually disappear as the educational system of the Territory is developed by the establishment of efficient high schools, but no date is set for abolishing even the first year of this preparatory course.

The University in all departments is open to persons of both sexes, who are qualified for admission. Through the aid received from the United States and from the Territory, it is enabled to offer its privileges to residents and non-residents, with only very moderate charges.

The purpose of the University of Arizona is, in the language of the organic law, "to provide the inhabitants of this Territory with the means of acquiring a thorough knowledge of the various branches of literature, science and the arts;" and so far as possible a technical education adapted to the development of the peculiar resources of Arizona. In furtherance of this latter purpose, instruction is provided especially in subjects fundamental to agriculture, the mechanic arts, mining, and metallurgy. The University, by the nature of its situation, frankly lays its strongest emphasis upon the course in mining engineering. It is, in reality, in a great mining laboratory, surrounded as it is on all sides by great mines. Some of these mines developed on a large scale are within a few miles of the city and the number and magnitude of such enterprises are steadily increasing. Probably no University in the United States offers such fine advantages to the students of mining engineering who desire to see the actual operation of great mines, or the development of great enterprises, while carrying on the theoretical and experimental work of the mining course. The advantages in civil engineering are hardly less noteworthy, for Tucson is not only a division point on the main line of the Southern Pacific railroad, with large shops and roundhouses, but it has the administrative and engineering headquarters for five of the subsidiary or allied lines of the Southern Pacific system in Arizona and in Sonora, Mexico, commonly known as the Randolph lines. All these lines are undergoing extensive expansion and rebuilding, and so furnish excellent opportunities for observation and vacation employment for students of civil engineering.

LOCATION AND CLIMATE.

The University of Arizona is located at Tucson, a city of fifteen thousand inhabitants, on the main line of the Southern Pacific railway, 312 miles west of El Paso, Texas, and 500 miles east of Los Angeles, Cal. The city lies in a broad, flat valley at an elevation of 2,400 feet above sea level and is surrounded by mountains. Its dry, mild, and equable climate has made Tucson a famous winter resort unsurpassed for healthfulness.

The winter climate is especially good; the temperature is cool and strengthening but not severe, the lowest temperature recorded during the average year being about twenty degrees above zero, Fahrenheit. Little rain falls during the winter; fogs are all but unknown; cloudy days are rare. The percentage of sunshine throughout the winter is greater than that recorded at any other place in the United States. Owing to the extreme dryness of the air the highest temperatures known are less oppressive to the senses and less dangerous to the health than the summer heats of the upper Mississippi Valley States. The total amount of rainfall averages less than twelve inches.

These advantages insure to students a comfortable education and a wide range of out-door sports and recreations throughout the college year.

The University Campus, consisting of fifty-five acres, is situated upon high ground about a mile from the business center of the city with which it is conside by an excellent electric street-car line. On every side it commands a view of mountain scenery of remarkable extent and grandeur. The buildings are lighted by electricity furnished by the city plant.

An abundant supply of unusually good water for household, laboratory and irrigation purposes is drawn from a large well on the Campus from a depth of one hundred and twenty feet.

The grounds have been carefully laid out in drives, lawns and gardens. A large number of palm, olive, umbrella, ash, pepper, bagota and cottonwood trees give the Campus the air of a well kept park.

BUILDINGS.

The main building, University Hall, is 200x150 feet, two stories in height; the first story of gray stone, the second of red brick. It is completely surrounded by a wide two-story veranda. The building contains recitation rooms, laboratories and apparatus rooms of various departments, an assembly room, and the office, laboratories and library of the Agricultural Experiment Station.

The library and museum building, costing about $32,000, including furnishings, was occupied in January, 1905. It is a handsome building of red brick and Bedford sandstone, with a massive tile roof. The interior finish is in natural oak and pine. The offices of the president and secretary of the University, three lecture rooms for the departments of geology, mathematics, English and history, work rooms for the library and museum, and a laboratory for the department of geology are on the first floor. The Library reading room, on the second floor is a large, well-lighted room, beautifully furnished with heavy solid oak reading tables, desks and wall cases. The stack-room at the rear is fitted up with the most modern steel stacks. The Museum occupies part of the first floor and the west half of the second floor. Fine oak and plate glass cases constitute the furnishings.

North Hall, a dormitory two stories in height, built of gray stone of fine quality, is occupied by the college men. Besides the parlor, and rooms of the instructors in charge, it contains seventeen rooms, each large enough to accommodate two students, besides bath and toilet rooms.

South Hall, a large brick building containing forty rooms, besides bath and toilet rooms and store rooms, is the dormitory mainly for preparatory students. It is heated by a hot-water system. It will accommodate seventy-five students.

West College and its new four-room annex are the dormitories for young women,—a two story brick house with wide porches, surrounded with vines, shrubbery, lawns and trees.

The Dining Hall, built of red brick, provides ample boarding accommodations for all persons living on the campus.

The Shop and Assay building is a large, substantial brick structure. It contains a commodious drawing room for mechanical and free-hand drawing, a large laboratory for forge work, machine practice and carpentry and a laboratory, instrument room and lecture room for the department of civil engineering. Two other rooms are used for lockers, and for the motor and engine. The assay laboratory and commercial assaying department occupy five rooms fully equipped with a large melting furnace, the necessary muffle furnaces, and other accessories for making complete and accurate assays.

The Mill or Mining Machinery building, located to the northeast of the main group of buildings, is a plain wooden structure in which are placed the stamp-mills, jigs, concentrating tables, separators, etc., necessary for the mining laboratory.

Herring Hall the gymnasium, is a very substantial high building, 40x80 feet, constructed of red brick and white plaster. It was erected in 1903, the gift of Professor James Douglas and his associates of the Copper Queen Consolidated Mining Company, through Colonel William Herring, after whom it was named.

The pump house and mechanical engineering laboratory was built in 1905. By the use of brick, cement and iron it is practically fire proof, thus insuring safety to the well and pumps supplying the University with water for all its uses.

Two two-story brick residences are occupied by the President of the University and by the Director of the Agricultural Experiment Station.

Other buildings are the cottage occupied by the department of domestic science, three green houses, a brick barn, and various smaller out-buildings used for shops and store rooms.

MAINTENANCE.

The University is maintained by funds appropriated by the United States and by the Territory of Arizona. Fifty-seven sections of very valuable pine land in Coconino County have been set apart by the Federal Government for the benefit of the University, but title and control of the land does not pass to the Board of Regents until the Territory is admitted as a State. In the meantime, only a very small sum is annually received from the leases of this land.

By the provisions of the Morrill Act of 1890, the University receives annually from the United States the sum of $25,000 "to be applied only to instruction in agriculture, the mechanic arts, the English language and the various branches of mathematical, physical, natural and economic science, with special reference to their applications in the industries of life, and to the facilities for such instruction." This Morrill Fund is to be ultimately duplicated by the "Nelson Fund," created by the Act of March 4, 1907, which appropriated $5,000 for the year beginning July 1, 1907 and provided for an annual increase of $5,000, until the total received by each State should be $50,000 per year from the two funds. The University receives from the same source, for the support of the Agricultural Experiment Station, $15,000 yearly from the Hatch Act of 1887; the Adams Act of 1906, for the current year, appropriates $9000 which is to be increased annually by $2000 until it also produces $15,000, giving the Station ultimately $30,000 per year.

The appropriations by the Territorial Legislative Atssembly of 1907 were $33,000 per year, for two year, for maintenance, $5,600 for the work of the Agricultural Experiment Station, and $40,000 for improvements ($20,000 to be available January 1, 1908, and $20,000 on January 1, 1909). This last sum will be used in the construction of a science building for the departments of chemistry, physics, and biology, plans for which have already been accepted by the Board of Regents. The building should be ready for occupancy by the spring of 1909.

The University also receives annually, from miscellaneous sources such as matriculation and tuition fees, rent of cottages, damage to University property, etc., about $1400. The receipts for board, lights, etc., amount to about $16,000 per year.

EQUIPMENT.

LIBRARY.

The library contains 13,000 bound volumes and 12,000 pamphlets, and is open for the use of all students. Of these volumes a collection of complete sets of scientific and literary periodicals, to which additions are being made yearly, is of special service in reference work. The library was made a regular depository of United States Government documents in 1907.

The books are classed by the decimal system and shelved in numeric order with a further author division according to the Cutter numbers. The catalogue is the usual dictionary card catalogue of authors, subjects and titles in one alphabetical arrangement. Library of Congress cards are used whenever obtainable. The Reading Room is supplied with about 600 books of general reference which may be consulted by the students without any formality. The following current periodicals and newspapers are on file for the use of students and general readers in the Reading Room:

PERIODICAL LIST.

*Advocate of Peace,
American Architect and Building News,
American Blacksmith,
American Chemical Journal,
American Chemical Society Journal,

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*Donated

*American Economist,
American Historical Review,
American Institute of Mining Engineers, Transactions,
American Journal of Pharmacy,
American Journal of Science,
American Journal of Sociology,
American Machinist,
American Magazine,
American Mathematical Society, Bulletin,
American Mathematical Society, Transactions,
American Naturalist,
Arena,
Annales des Mines,
Australian Mining Standard,
*Arizona Mining Review,
Association of Engineering Societies, Journal,
Athenaeum,
Atlantic Monthly,
Biedermann's Zentralblatt fur Agrikulturchemie,
Bookman,
Botanical Gazette,
Botanisches Centralblatt,
*California Cultivator,
Canadia Entomologist,
Canadian Mining Journal
*Canal Record,
Cassier's Magazine,
Cement,
Century,
Chemical News,
Chemical Society, Journal, (London)
Chemisches Centralblatt,
Coke and Coke,
Collier's Weekly,
Craftsman,
Cumulative Book Index,
Current Literature,
Delineator,
Duetsche Chemische Gesellschaft, Berichte,
Dial,
Economic Geology,
*Educational Gazette,
Educational Review,

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* Donated

Electrical World,
Electrochemical and Metallurgical Industry,
Engineering and Mining Journal,
Engineering Magazine,
Engineering News,
Engineering Record,
Espana Moderna, La.
*Farmer's Voice,
Fern Bulletin,
Forestry and Irrigation,
Forum,
Franklin Institute, Journal,
Geological Magazine,
Geological Society of America, Bulletin,
Geologisches Centralblatt,
Good Housekeeping,
Graphic, (London)
Harper's Monthly Magazine,
Harper's Weekly,
Institut de France, Paris, Academie des Sciences, Comptes rendus des Seances.
International Studio,
Irrigation Age,
Journal of Geography,
Journal of Geology,
Journal of Political Economy,
Ladies' Home Journal,
Litterarisches Zentralblatt,
Literary Digest,
Living Age,
*Lowell Observatory, Bulletin,
McClure's Magazine,
Manual Training Magazine,
Mines and Minerals,
Mining and Scientific Press,
*Mining Reporter,
*Mining Review,
Mining Science,
*Mining World,
Nation,
New Zealand Mines Record,
Nineteenth Century and After,

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* Donated

North American Review,
*Our Dumb Animals,
Out West,
Outing,
Plant World,
Poet-lore,
Popular Science Monthly,
Power,
*Prairie Farmer,
Public Libraries,
Publishers' Weekly,
Reader's Guide to Periodical Literature,
Review of Reviews,
Revue des Deux Mondes,
School Review,
School of Mines Quarterly,
Science,
Scientific American,
Scientific American, Supplement,
Society of Chemical Industry, Journal,
Scribner's Magazine,
Societe Francaise de Mineralogie, Bulletin,
World's Work,
Zeitschrift fur Anorganische Chemie,
Zeitschrift fur Physikalische Chemie,

NEWSPAPERS ON FILE IN THE READING ROOM.

*Arizona Blade,
*Arizona Bulletin,
Arizona Daily Star,
*Arizona Gazette,
Arizona Range News,
*Arizona Silver Belt,
Arizona Weekly Journal Miner,
Bisbee Review,
Coconino Sun,
Los Angeles Times,
*Graham County Guardian,
Mojave County Miner,
*Oasis,
Prescott Weekly Courier,
Southwestern Stockman,
*Tempe News,
Tucson Citizen,
Tucson Post,
Tombstone Epitaph,
Weekly Republican.

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* Donated

The Carnegie Library of the city of Tucson is also open to the use of the students of the University. This library is also a depository of United States Government documents.

MUSEUM.

The Seventeenth Legislative Assembly of Arizona established a general museum at the University, to promote the collection of materials of all kinds illustrating the resources and development of Arizona, and particularly to preserve historical relics, including those pertaining to the aboriginal inhabitants. Donations of specimens and collections will be received and acknowledged with thanks, but no special provision has yet been made by the legislature for the support of this department, aside from a small appropriation for the salary of a curator.

The professors of the University have the immediate care of the collections pertaining to their respective departments, The collections now displayed at the University comprise representative series of minerals, ores and rocks of Arizona. Among these may be particularly mentioned superb specimens from the mines of the Copper Queen at Bisbee. There are also collections of typical rocks and minerals for comparison, and many specimens of ores from different parts of the United States and from abroad. It is desired to make the collection of ores and minerals fully represent the great mineral resources of Arizona.

A large amount has been recently spent upon new cases for the Museum in its new quarters, and the material thus re-arranged and displayed in good light becomes doubly attractive and useful.

The Museum is indebted to Mr. Herbert Brown, curator, for a large and valuable collection of skins of the birds of Arizona, which he has deposited in the Museum, as well as for a collection of ancient aboriginal pottery and other relics. The fossil skull and teeth of and elephant and other fragmentary remains of extinct animals sent from Yuma by Mr. Brown deserve special mention.

Historical records of much value are gradually accumulating as a part of this Museum, and an appeal is made to old settlers and others to bear this fact in mind when making disposition of articles bearing even remote relation to the early pioneers and their history. All records and data of any nature that can be gleaned are worthy of preservation, and it is earnestly desired to have them placed at the University, where they will always be accessible for reference.

BIOLOGY.

The biological laboratories are located on the second floor of University Hall. They are convenient and well-lighted, and the equipment is such as is required for modern instruction and research in the biological sciences. The library and apparatus are well selected and adapted to the region and the courses offered.

The collections possessed by the department form a very important part of its equipment. The herbarium consists of 12,000 sheets of mounted plants, of which number 2,500 are included in the University botanical survey herbarium. The unique flora and fauna of the mountain, mesa and lowland collecting grounds, in close proximity to the institution, offer very attractive opportunities for instruction and research especially along ecological lines. The Desert Botanical Laboratory of the Carnegie Institution supplements in most admirable fashion the facilities of the University for investigation.

In addition to the above there are fifty cases of insects, a large case of seeds, articulate and disarticulate human skeletons, plaster and papier-mache models of the important structures of the human anatomy, and duplicate material for study and dissection.

CHEMISTRY.

The chemical laboratories used for instruction are two in number. That used by beginners in the study of general chemistry and qualitative analysis is on the second floor of University Hall, and is equipped for the experimental and theoretical study of chemical science.

The laboratory for quantitative analysis is on the first floor of University Hall. It is thoroughly equipped for the teaching of volumetric and gasometric analysis, blow-pipe analysis, metallurgical chemistry, and wet and fire assaying, including apparatus for the electrolytic determination of metals.

The balance room contains analytical and bullion balances of the latest model so arranged as to insure a maximum of stability and accuracy. A lecture and demonstration room fitted with sinks, cabinets, etc., completes an equipment of apparatus and collections adequate for first-class instruction in both theoretical and practical chemistry.

The laboratories of the Agricultural Experiment Station occupy three rooms on the first floor. These are devoted to analytical work and chemical investigations relating to agriculture. Though not intended for the use of students they are of incidental value to the instructors and students through the investigations which are here conducted.

MINERALOGY AND PETROGRAPHY.

The laboratory for quantitative analysis is used for determinative mineralogy and blow-pipe analysis. The laboratory is supplied with necessary apparatus for student work, including glass and wooden models for the study of crystallography, hand and reflecting goniometers for the measurement of the angles of crystals, a polariscope for the study of optical properties of minerals, and a type set of 600 minerals.

For the study of petrography the laboratory is supplied with a type set of rocks classified according to Rosenbusch's *Elemente der Gesteinlehre* with thin sections corresponding, four petrographic microscopes, a collection of oriented sections of minerals and apparatus for studying interference phenomena.

PHYSICS.

Three rooms on the first floor of University Hall are set apart for the teaching of physics. The facilities for experimental demonstration of all important phenomena are very complete. The lecture room is fitted with shutters so that it can be darkened. A beam of sunlight directed by a fine clock heliostat outside may be thrown steadily across the lecture table for experiments on light, or for use in connection with the solar lantern for a variety of other work. Adjacent to the lecture room are the laboratories and the apparatus room. Both lecture room and laboratories are supplied with water and gas.

An eight-inch Willyoung induction coil with storage and X-ray accessories is used in the study of high-tension electricity. Through the generosity of the Honorable Mark J. Egan, of Clifton, the University added to its equipment for the study of electricity a fine imported set of miniature wireless telegraphy apparatus, capable of transmitting messages about two hundred feet.

This department also has a double dissolving arc-light Ideal stereopticon, and projectoscope which are used by various other departments of the University and for public lectures before the students.

MATHEMATICS.

Models are an important aid to the study of mathematics. The collection of the department includes thread models of about forty ruled surfaces of the third, fourth and sixth orders. These illustrate the theory of surfaces and are also valuable in the study of kinematics and linkages.

The Bulletin and Transactions of the American Mathematical Society, and the Encyklopedia der Mathematischen Wissenschaften are subscribed for by the University Library.

MINING ENGINEERING AND METALLURGY.

The Mill, or mining engineering and metallurgical laboratory, is equipped for use by the students of metallurgy in connection with their work in testing ores as to their adaptability for treatment by different processes both on a large and small scale.

The chief features of the equipment are: a Blake crusher, 4 in. by 7 in.; a Dodge crusher, 4 in. by 6 in.; sampling rolls, 6 in. by 9 in.; a cone and burr sample grinder; a pebble mill with a capacity of about 15 lbs. at one charge; a laboratory lightning crusher and a disc pulverizer; a 5-stamp mill, with 800-pound stamps; a 3-stamp mill, with 250 lb. stamps; inside and outside amalgamated plates for the same; a 2 ft. clean-up pan; a 1 ft. amalgamation pan, and a 9 jar revolving agitator for testing samples of a few ounces; a No. 5 Wilfley table of the latest pattern, and a Hallett hand jig; a 1 1-2 ton cyanide plant for treating sands or dry crushed ore; two 150 lb. cyanide plants for treating smaller samples 3 ft. agitator; a 12-in., 6-chamber, flush plate and frame, washing filter press and pump for the same; a Sturtevant shaking screen; a Tullock ore feeder, a belt and bucket elevator, sampling plates, split samplers, a shaking screen, percolators, sizing screens from 1-mesh to 200-mesh, miner's pans, bateas, retorts, etc.

The power for operating this plant is furnished by a 30 h. p. Westinghouse induction motor, type C.

The assay laboratory is equipped with assay furnaces for crucible work, for scorifying and cupeling, and for retorting mercury from amalgam, besides all needed appliances for assaying by dry and wet method including electrolysis. The laboratory also has desks and fittings for the chemical work required in the metallurgical and mineralogical investigation and analysis of ores, in mineral fertilizers, and in qualitative tests of minerals.

CIVIL ENGINEERING.

The apparatus in this department has been chosen with the view of familiarizing the student with the instruments which are used in practical civil engineering work and in the allied branches of hydraulic and mining engineering. The equipment includes surveyors' and engineers' levels; plane table; stadia, level, and transit rods; aneroid barometers; odometer; automatic water registers; hook gauges; current meters; drafting instuments; mechanical calculators; planimeter; a complete set of apparatus for testing cemnt; and an Olsen Universal testing machine of 100,000 pounds capacity.

MECHANICAL ENGINEERING.

This department has a drafting and recitation room in the Library Building in addition to the regular drawing rooms of the department of Mechanic Arts. In this room is the catalogue file containing the trade literature of about five hundred leading manufacturers of the United States; the collection of working drawings consisting of over three hundred blue prints, and the sample collection of models, machine parts, valves, electrical fittings, insulating materials, abrasives, etc.

The mechanical and electrical laboratory, which occupies a large room adjoining the Pump House, is equipped for the study and operation of boilers, steam and gasoline engines, hydraulic and electrical machinery. Besides the machinery of the shop and mill which can be used for experimental purposes and for study of machine design, the University has a 45 h. p. tubular boiler, 35 h. p. Atlas engine, 30 h. p. Scott engine, a 10x7x10 Worthington Duplex pump, a Duplex feed pump, a Cameron pump, a 3 h. p. and a 1-2 h. p. direct current electric motor, an injector, a 500 gallon fire pump, a 40 h. p. Fairbanks-Morse gasoline engine, a 23 k. w. direct current Crocker-Wheeler generator, electrical measuring instruments, and a steam guage tester. A 300 gallon two-stage centrifugal pump in the University well and its electric motor serve as part of the equipment for mechanical engineering.

MECHANICAL ARTS.

The Mechanic Arts building, provided largely through the generosity of the Copper Queen Consolidated Mining Company, has a total floor area of 7,900 square feet divided as follows: Power room and draughting room, each 1,200 square feet; wood-working shop, forge shop and machine shop, each 1,400 square feet; wash room, 600; model room, 400, and store room 300 square feet.

The entire building is well ventilated and lighted, from above as well as from the sides. The drafting room is heated by steam.

The wood shop is equipped with a full assortment of hand tools, six turning lathes, a Universal wood-working machine, a Whitney dimension sawing machine, a band saw, a Universal trimmer and a large grindstone with truing device.

The forge room contains twenty-four down-draught forges, twenty-four anvils, a combination shear and punch, a blacksmith's drill press and a full assortment of small tools and appliances. Blast is furnished by a No. 3 Sturtevant blower; the smoke and gases are removed by a 70-inch exhaust fan.

The machine shop contains one 24-inch Lodge and Shipley engine lathe with taper attachment, two 14-inch Lodge and Shipley lathes, one 14-inch Pratt and Whitney lathe with taper attachment, one 10-inch Reed speed lathe, one 16-inch Cincinnati shaper, one 24-inch by 6-foot Woodward and Powel planer, one Brown and Sharpe No. 2 Universal milling machine, one Brown and Sharpe No. 1 Universal grinder, one

24-inch Prentice Bros. drill press, one power hack saw, one drill grinder, one emery stand and one grinding attachment for the lathes. A 1 1-2 ton portable crane and a 1-ton triplex chain hoist are used in handling the heavier work.

Each shop has its own tool room well arranged and supplied with small tools, gauges, measuring instruments, etc.

A large wash room, containing a hundred lockers, is supplied with basins and running water.

AGRICULTURE AND HORTICULTURE.

The equipment for agricultural instruction is good. The University leases a tract of twenty-three acres of cultivated land in the Santa Cruz valley near the city, for purposes of instruction and demonstration. It has also laboratory equipment consisting of an excellent seed collection, a green house and gardens for experimentation, and a well-selected agricultural library.

In addition to regular courses of instruction in agriculture and horticulture. "Timely Hints for Farmers," issued under the auspices of the Experiment Station, are of distinct educational value. Three thousand farmers of the Territory are reached more or less regularly by timely publications on subjects of vital interest. Farmers' Institutes, announcements of which are made from time to time, take the form of short courses in agriculture.

Small and well selected agricultural libraries of slight cost have been forwarded to a considerable number who have expressed a willingness to receive them.

GYMNASIUM.

Herring Hall, the gymnasium, is fully equipped for the purposes of the department of physical training and athletics. The apparatus is of standard make, and includes forty chestweights, dumb-bells, bar-bells, wands, Indian clubs, Medart vaulting horse, parallel bars, horizontal bar, quarter-circle, abdominal chair, wrestling machine, wrist machine, finger machine, chest expander, chest developer, climbing rope, flying rings, traveling rings, striking bag and drum, jump and vaulting stands, fencing foils and masks, basket balls and goals, five large mats and a set of anthropometric apparatus.

In the basement are located ninety-six lockers, and five shower baths which are supplied with hot water from a heater with large reservoir.

In connection with this equipment are the base ball and football fields, and four fine tennis courts.

A gallery built across the west end of the gymnasium, with a seating capacity of about one hundred and fifty, much increases the convenience and usefulness of this building.

MILITARY.

Room O is used as an armory. It is fitted up with the necessary gun racks and accessories. The equipment includes 150 old style Springfield rifles, 100 new Springfield rifles with complete accoutrements, eight sabres and belts, musical instruments for the band, and signal flags. A large clear area south of the Library building is kept leveled and smooth for a drill ground and parade ground. At the rear of the Mill building are the targets for short range practice.

GENERAL INFORMATION

COLLEGE OF AGRICULTURE AND MECHANIC ARTS.

The courses offered in the College of Agriculture and the Mechanic Arts provide both a liberal training along literary and scientific lines and technical training along engineering, mechanical and agricultural lines. Great latitude of election is given in the literary and scientific courses, but the courses in engineering are more rigid in their requirements. Full details of the various courses follow. The aim in all is to combine the practical with the theoretical instruction. The needs of a young and growing commonwealth are kept in mind, and a steady attempt is made to develop the adaptability and resourcefulness so necessary to meet changing conditions.

ARIZONA SCHOOL OF MINES.

The School of Mines is designed for the education and training of young men in the arts and sciences directly involved in the industries of mining and metallurgy. Especial attention is given to the sciences of mathematics, physics, chemistry, mineralogy, geology and their applications. The Bureau of Mines and Assaying, while not directly connected with the work of instruction, affords with its laboratory and the influx of new material, a valuable object lesson to the advanced students of mining and metallurgy.

REGISTRATION.

All students are expected to register on registration day at the beginning of the year and at the beginning of the second semester, in the University office or in such rooms as may be designated on that day. Before making choice of elective subjects the student should in every case confer with the instructors concerned and with the committee on registration. A matriculation fee of $5.00 is required of all students upon entering the University. No student will be considered registered until the matriculation fee has been paid. This fee is paid once and is not required for future registration. After registration no change in classes can be made without the consent of the committee on registration.

Students entering from other institutions should present to the committee certified copies of their records in such schools, together with certificates of graduation or of honorable dismissal. A copy of the school catalogue or course of study should be furnished with the credentials, in order to facilitate the work of the committee.

TUITION.

Tuition is free to students of Arizona. For all non-resident students, tuition is $10 for each semester. No reduction will be made for late registration or early withdrawal.

RECORDS.

The class standing of each student is determined by the instructor in charge. The method of ascertaining the student's record is left to the instructor, and his report in all cases is final.

DISCIPLINE.

The disciplinary policy of the University in all its departments is based upon the assumption that the students are young gentlemen and young ladies who come to the institution with a high determination to utilize fully the opportunities offered, and with a keen sense of duty, honor and courtesy to each other and to the faculty. Formal and explicit prohibitions and rules are few, but those will be rigidly enforced, with adequate penalties, and good order and discipline will be maintained. The University is a civil, rather than a military community, and such privileges as will not be abused will be allowed all classes of students. In aggravated cases, such as cheating in University work, frequenting saloons, and other objectionable places, and serious breaches of peace or order, the faculty will not hesitate to proceed to the extreme measure of expulsion. In case of expulsion the student is required by regulations of the Regents and faculty to leave the campus immediately, and by Territorial statute to surrender his cadet uniform to the University. In all matters of discipline the faculty and President will strive for fairness, equity and efficacy rather than uniformity.

Students or classes desiring to make requests of the faculty should file their petition in the Presidents's office before the hour of faculty meeting; class petitions must be presented at least two days before the time of meeting.

VACATIONS AND HOLIDAYS.

A short recess (See calendar, page 2) is taken at Christmas time. The long summer vacation begins about June first and continues until the middle of September. The Thanksgiving recess extends from the close of the regular exercises on the Wednesday before Thanksgiving to the next Monday morning. During the spring, the cadet companies make a practice march of from three to seven days, which constitutes in reality a third vacation for the preparatory department and for freshmen. All legal holidays are observed by the cessation of ordinary University work.

Arbor day has been formally adopted by the University Regents as the regular anniversary on which to celebrate the founding of the institution, in connection with the ceremonies of tree planting.

LIVING ACCOMMODATIONS.

Provision is made so far as possible for furnishing board and rooms to students of both sexes upon the University grounds. Young men have comfortable quarters in South Hall, which can accommodate about seventy-five students, two in a room, and in North Hall (for college men only), which can accommodate thirty-five students. West College, the home of the young ladies, is in charge of an experienced and capable preceptress who has constant supervision of those rooming there. *No students known to have tuberculosis will be admitted to the dormitories or dining hall.*

All dormitories are lighted by electricity. Rooms contain a clothes press, and are provided with single bedsteads, table, chairs, mirror, wash-bowl, pitcher and slop-jar. Students will supply their own mattresses, pillows, sheets, blankets, towels, rugs and brooms, and such other articles as they may desire for ornamenting their rooms. They will care for their own rooms under the direction of the head of the dormitory. The Dining Hall of the University has accommodations for one hundred students. It is under the management of a paid steward who is responsible to the President and the Board of Regents. While the charge for board is very low, it is the aim of the management to serve substantial, wholesome, appetizing meals. All students having rooms in the dormitories are required to take their meals at the Dining Hall. Students and members of the faculty, who reside outside the dormitories, may board at the Dining Hall.

FEES AND EXPENSES.

	Lowest.	Highest.
Tuition free to students from Arizona		
Tuition, students non-resident in Arizona, each semester	$10.00	$10.00
Maintenance fee (deposit) by students in men's dormitory	3.00	3.00
Maintenance fee (deposit) by male students residing in town	1.00	1.00
Mining excursions for advanced students	20.00	40.00

Laboratory and shop fees, varying according to courses, per annum ..	2.00	30.00
Military uniforms	16.25	24.00
Books, per annum	5.00	20.00
Board, per month	17.00	20.00
Lights per room, per month	.50	1.50
Napkins	.50	.50

By resolution of the Board of Regents of the University, board is to be paid in advance on the twelfth of each month. If tickets for the Dining Hall are not purchased before the twelfth of each month, $18.00 instead of $17.00 will be charged for the month's board. Checks and postoffice or express money orders should be made payable to the President. No reduction in the bill for board will be made for a period less than one week, except by special arrangement at the office.

Text-books may be obtained directly from the publishers through a book association managed on the co-operative plan under the direction of the faculty. Members of the cadet companies will be required to provide themselves with the prescribed uniform, which will be ordered by the University. The cost of the cadet gray, woolen uniform, which must be deposited in advance, averages about $16.25. The uniform has shown better wearing qualities than a civilian suit of equal cost, and parents are urged to consider the matter of uniform when supplying their sons with clothing for the approaching University year. It may be worn on all occasions, and thus will remove the necessity for additional expenditure for outer clothing other than overcoats. When the warm weather of spring comes, the students are expected to purchase the regulation khaki uniform and campaign hat, the total expense being about $7.

The University has at present no loan funds with which to aid students who must earn their way. Various positions about the grounds, buildings and laboratories of the University, paying from $4 to $20 per month, are filled by students who must be self-supporting. The number, however, is not large, and preference is given to students from Arizona and to those who have spent time enough in the University to demonstrate that they are earnest, capable, reliable young men, likely to do this outside work and at the same time maintain a good record as students.

The Philo Sherman Bennett scholarship was constituted by the gift of $500 to the University in 1905, through the agency of Mrs. William Jennings Bryan, to be used in aiding young women to secure an education. The income will be awarded to a deserving applicant in the year 1908-9.

REQUIREMENTS FOR ADMISSION.

Applicants for admission to any department of the University will be required to furnish satisfactory evidence of good moral character, and certificate of graduation or of honorable dismissal from the schools with which they were last connected.

For admission to the Freshman class, applicants must be at least sixteen years of age and must satisfy requirements in subjects sufficient to give sixteen credits as described below. A credit is understood to be the equivalent of one study pursued satisfactorily at least four times a week for one year, as ordinarily taught in high schools.

Students coming from approved high schools, and presenting a detailed official statement of work completed from the principals of such schools, will be excused by the committee on registration from entrance examinations in those subjects covered by the credentials, with the exception of English composition. Other students will be required to pass the entrance examinations.

For admission to the course leading to the degree of Bachelor of Philosophy, the subjects and credits assigned each are:

English	4
Mathematics	2
History and Civics	2
Science	1
Latin	3
Greek, French, German or Spanish	2
Elective	2

For admission to the course leading to the degree of Bachelor of Science, including the degrees of Bachelor of Science in Mining Engineering, Civil Engineering, Mechanical Engineering, or Metallurgy, the subjects and credits assigned each are:

English	4
Mathematics	4
History and Civics	2
French, German or Spanish	2
Science (Physics required)	3
Elective	1

The scope of work required in these various subjects is as follows:

ENGLISH—(a) English classics. An acquaintance with the works named below. These works are divided into two classes, those intended for thorough study and those intended for general reading. The portion of the examination devoted to the former class will be upon subject matter, form and structure. In addition, the candidate may be required to answer questions involving the essentials of English Grammar, and the leading facts in those periods of English literary history to which the prescribed books belong. In the portion of the examination devoted to the latter class, the candidate will be required to present evidence of a general knowledge of the subject matter, and to answer simple questions on the lives of the authors. The form of examination will usually be the writing of a paragraph or two on each of several topics, to be chosen by the candidate from a considerable number—perhaps ten or fifteen—set before him in the examination paper. The treatment of these topics is designed to test the candidate's power of clear and accurate expression, and will call for only a general knowledge of the substance of the books. In preparation for this part of the requirement, it is important that the candidate shall have been instructed in the principles of writing English. A knowledge of grammar is presupposed. (b) English composition. This requirement can be met only by examination of the candidate or by his presenting satisfactory composition books of themes certified by a former teacher as original uncorrected work. The examination will take the form of a theme of five hundred words on some subject familiar to the candidate and will be a practical test of his ability to express himself in writing clearly and consecutively. No candidate will be accepted whose work is notably defective in point of neatness, spelling, punctuation, idiom, or division into paragraphs. Those found lacking in composition will be required to make good the deficiency at once in a special class organized for that purpose.

No student will be admitted without examination, except on the certificate from his former instructors that the entire requirement has been fulfilled. Substantial equivalents, properly certified, will be accepted.

For the thorough study: For 1909, Shakespeare's *Macbeth;* Milton's *L'Allegro, Il Penseroso, Comus, Lycidas;* Burke's *Speech on Conciliation with America* or Macaulay's *Life of Johnson,* or Washington's *Farewell Address* and Webster's *First Bunker Hill Oration,* or Carlyle's *Essay on Burns.*

For general reading and practice, selections will be made, at the discretion of the teacher from groups I-VI of College Entrance Requirements in English for 1909-11.

MATHEMATICS—Arithmetic as covered in White's *Advanced Arithmetic* to the appendix, but these subjects will be omitted in the entrance examinations; longitude and time, present worth, stock investments, exchange, equation of payments, compound proportion, partnership and cube root. Algebra, through quadratic equations, as given in Wells' *Essentials of Algebra* or Wentworth's *New School Algebra*. Plane geometry as treated in the latest editions of Wentworth or Wells. For students in the scientific or engineering courses, solid geometry and trigonometry, each requiring a half-year of work, will be required.

HISTORY AND CIVICS—As much as is included in Adams's *European History;* Hinsdale's *American Government,* or Hart's *Actual Government,* together with Channing's *Student's History of the United States,* or Montgomery's *Student's American History,* or text books covering equivalent ground. To meet these requirements a large amount of reference work is expected. In place of general history the following will be accepted: History of Greece and Rome as contained in Myers' histories of Greece and Rome, or an equivalent; and Coman and Kendall's or Larned's *History of England.*

*GREEK—As covered by Gleason and Atherton's *Beginners' Greek Book;* Xenophon's *Anabasis,* four books; Homer's *Iliad,* three books, with composition and the use of Hadley and Allen's, or Goodwin's *Greek Grammar.*

*LATIN—As covered by Collar's *First Latin Book* and *Viri Romae,* together with Allen and Greenough's *Grammar* and texts; sight reading; Cæsar, four books, or an equivalent; Cicero, four orations; Virgil, six books; sight reading from Nepos, Cicero and Gellius; Daniell's or Bennett's *Prose Composition.*

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*If any language is offered it must be to the extent of two credits, since a single year's study of a language is not considered of sufficient educational value to be entitled to credit.

*GERMAN—As covered by Thomas' *German Grammar,* with readings outlined for German 1, 2, 3, 4, or an equivalent.

*SPANISH—As covered by Hills and Ford's *Spanish Grammar* with readings, etc., outlined for Spanish 1, 2, 3, 4, or an equivalent.

*FRENCH—As covered by Fraser and Squair's *French Grammar* (Parts I and II) with readings, etc., outlined for French 1, 2, 3, 4, or an equivalent.

SCIENCE—Under this head may be offered the required number of credits in the following subjects: physical geography, physiology, botany, chemistry, physics or elementary astronomy. At least half the preparation in science should consist of laboratory work. Note-books, containing such laboratory work as has been performed by the student, should be presented for examination.

ELECTIVE—The remaining credits required may be made up from additional subjects ordinarily taught in high schools.

Students from other institutions of equivalent rank may be admitted to classes higher than freshmen upon presentation of properly authenticated certificates showing to the satisfaction of the faculty that they are qualified to proceed with their required work. These certificates must be accompanied by statements of honorable dismissal, or leave of absence.

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*If any language is offered it must be to the extent of two credits, since a single year's study of a language is not considered of sufficient educational value to be entitled to credit.

By arrangements with the Arizona Normal School at Tempe, and the Northern Normal School at Flagstaff, students from these institutions will be received into the University without examination, and given credit for all work which is the equivalent of courses offered by the University either for admission or for a degree. Students from this University may also obtain the equivalent privilege at the Normal Schools by presenting the proper certificate of standing, signed by the president.

The faculty desires to establish such relations with high schools and other educational institutions as will enable it to accept their certificates without question. To this end presiding officers are respectively requested to correspond with the President.

COURSES OF STUDY AND DEGREES

All facilities and privileges of the University are open to qualified persons of both sexes.

The University offers four-years courses of study leading to the degrees of Bachelor of Philosophy and Bachelor of Science, and to those degrees specialized as shown on pages 51-52. In each course the work is partly required and partly elective, as described by schedules later. Each student doing full work is required to take not less than sixteen hours of class room work per week. In laboratory work a period from two to three hours is considered the equivalent of one recitation hour.

Persons of mature age and with sufficient preparation, who are not candidates for degrees, may be admitted to regular classes as special students, provided, however, that in all such cases they show to the satisfaction of the instructors in charge that they can take the course with profit to themselves and without detriment to the regular class. It is expected that those who desire thus to specialize in mineralogy, assaying, geology or surveying, will have had at least a high school education, or its equivalent, particularly in English, algebra, geometry, physics and chemistry.

The faculty reserves the right to omit classes in any course of instruction unless a suitable number of students register for the course.

Students who have completed satisfactorily the required work, and the specified amount of elective work, as shown in the accompanying schedules, will be given the degree of Bachelor of Philosophy or Bachelor of Science. The special character of any course of study may be indicated by adding to the degree the name of the department, as: Bachelor of Science in Mining Engineering, or Bachelor of Science in Metallurgy.

Military science and tactics or, for women, physical culture, is required during the Freshman and Sophomore years. If for any reason a student is excused from these exercises, an additional subject having a minimum of three recitation hours per week will be required.

Credit toward degrees is given by means of a unit system which assigns to each course of instruction offered a certain number of units of credit. A unit ordinarily represents one class-room hour per week, or its equivalent of two or three laboratory hours, for one semester. One hundred and twenty-eight units besides six units in military science and tactics and physical culture, are required for obtaining a degree in any course.

Any candidate for a degree may present as part fulfilment of requirements for graduation an acceptable thesis embodying the result of a special study of some subject within the range of the course pursued. The subject of the thesis must be submitted for the approval of the faculty at the opening of the Senior year, and the completed thesis must be presented not later than three weeks before commencement day. The credit value will be determined by the faculty at the time the subject is approved.

GROUPS OF COURSES.

General—English, Mathematics.

Group A.—Latin, Greek, French, German, Spanish.

Group B—History, Economics, Philosophy, Sociology, Domestic Science.

Group C—Astronomy, Botany, Chemistry, Geology, Mineralogy, Physics, Zoology.

Group D.—Civil Engineering, Mechanics Arts, Mechanical Engineering, Metallurgy, Mining Engineering.

The units necessary for the different degrees are as follows:

BACHELOR OF PHILOSOPHY.

a Required—English, 24; Philosophy, 15; History and Economics, 8.
b Group Electives—From Group A, 32; Group C. 16.
c Free electives—33.

BACHELOR OF SCIENCE.

a Required—English, 8; Mathematics, 16.
b Group Electives—From Group B, 4; Group C and D, 56.
c Free electives—44.

For the degrees of Bachelor of Science in Mining Engineering, Metallurgy and Civil Engineering, the same work is required in all for the first two years, as shown on the following pages.

MINING ENGINEERING, METALLURGY, CIVIL ENGINEERING.

First Year.		Second year.	
English, 1, 2,	6 units	Mathematics, 3, 4	6 units
Mathematics, 1, 2	10 “	Physics, 1, 2	8 “
Chemistry, 1, 2	8 “	Chemistry, 3, 4	8 “
Mech. Arts, 1, 2, 3, 4	8 “	Mech. Arts, 5, 6	4 “
		Civil Eng., 1, 2	8 “
	32 “		34 “

MINING ENGINEERING.

Third year.		Fourth year.	
Mathematics, 5, 6	9 units	Mining Eng., 1, 2,	8 units
Mineralogy, 1, 2	7 “	Geology, 3, 4	6 “
Geology, 1, 2	8 “	Metallurgy (lect.)	3 “
Civil Eng., 5, 6	8 “	Civil Eng., 10	4 “
		Mineralogy, 3, 4	4 “
	32 “	Mech. Eng., 1, 2	6 “
			31 “

METALLURGY.

Third year.		Fourth year.	
Mathematics, 5, 6	9 units	Mech. Eng., 1, 2	6 “
Mineralogy, 1, 2	7 “	Metallurgy, 1, 3, 4, 5, 6	12 unts
Geology, 1, 2	8 “	Mining Eng., 1	4 “
Chemistry, 5, 6	8 “	Civil Eng., 5, 6	8 “
	32 “		30 “

CIVIL ENGINEERING.

Third year.	
Mathematics, 5, 6	9 units
Civil Eng., 5,6	8 “
Civil Eng., 4	1 “
Civil Eng., 9	4 “
Civil Eng., 12	2 “
Mineralogy, 1	4 “
Physics, 4	4 “
	32 “

Fourth year.	
Civil Eng., 7, 8	8 units
Civil Eng., 10	4 “
Mech. Eng., 1, 2	6 “
Elective	12 “
	30 “

MECHANICAL ENGINEERING.

Second year.	
Mathematics, 3, 4	6 units
Physics, 1, 2	8 “
Mech. Arts, 5, 6	4 “
Mech. Eng., 3, 4	6 “
Civil Eng., 1, 2	8 “
	32 “

Third year.	
Mathematics, 5, 6	9 units
Civil Eng., 5, 6	8 “
Mech. Eng., 1, 2	6 units
Physics, 3, 4	7 “
Mech. Arts, 7, 8	4 “
	34 “

Fourth year.	
Mech. Eng., 5, 6	8 units
Mech. Eng., 7, 8	8 “
Civil Eng., 10	4 “
Elective,	10 “
	30 “

COURSES OF INSTRUCTION

Courses having odd numbers are given in the first semester; those having even numbers, in the second semester. The hours mentioned show the number of periods per week. The subjects are arranged alphabetically.

AGRICULTURE.

AGRICULTURE 1. PLANT CULTURE AND ORCHARD MANAGEMENT. Elementary plant physiology taking up the process of seed germination; the function of root, stem, leaves, buds, flowers; the plant as affected by unfavorable environment. Plant propagation. Selection of orchard site; lifting, packing, shipping and transplanting trees and vines, cultivation, pruning, spraying, picking, packing, and marketing fruits. Open to all preparatory students. 3 hours, first semester.

AGRICULTURE 2. POULTRY HUSBANDRY. The general care and management of poultry, production of poultry products for the market, diseases and pests, characteristics of breeds. 2 hours, second semester.

AGRICULTURE 4. HOME AND MARKET GARDENING. Practical and theoretical training in the general principles underlying successful intensive farming and the adaptability of Arizona for this branch of farming. 3 hours, second semester.

AGRICULTURE 3. IRRIGATION ENGINEERING. Measuring and handling of ditch water, pumping plants, steam and gasoline engines, electric motors. 5 hours, first semester.

AGRICULTURE 5. FARM DAIRYING AND FEEDING. Production of sanitary milk on the farm, care of dairy cows, principles of butter making, animal nutrition, feeds and feeding. 3 hours, first semester.

AGRICULTURE 6. FARM MANAGEMENT. The course in farm management will deal with the laying out of ranches or farms with refernce to arrangement of ditches, buildings, roadways, pumping plants, application of water—ridge culture, flooding on slopes, on dead levels, cultivation with reference to moisture, alkali, sediments, weeds, latent fertility, control of climatic conditons, management of alkali, crop production, successions and rotations, marketing of farm produce, business aspects of farming, such as shipping associations, markets, transportation, and farm bookkeeping. 3 hours, second semester.

AGRICULTURE 7. TYPES OF STOCK. The conformation of beef and dairy cattle and exercises in using the score card. 2 hours, first semester.

AGRICULTURE 10. VETERINARY SCIENCE. Animal physiology, sanitation, symptoms of common diseases and pests, and their remedies. 2 hours, second semester.

AGRICULTURE 8. SOIL PHYSICS. Origin, composition, and classification of soils; soil moisture and methods of conserving it, soil temperature and conditions influencing it, soil texture as affecting the supply of heat moisture and plant food, various culture methods in relation to soil texture, and plant food, surface tension capillarity, osmosis and diffusion as affecting soil conditions; root development, mechanical analysis of soils. 3 hours, second semester.

ASTRONOMY.

PROFESSOR DOUGLASS.

The wonderful atmosphere of Southern Arizona is the best in the United States for astronomical observation, because it has a smaller percentage of cloud and a lesser average wind velocity than any other locality where records have been preserved. The dry air and 2400 feet elevation give Tucson such a clear sky that faint stars may be watched till they set behind the distant horizon. The fine weather, day after day, gives opportunity for a consecutiveness of observation not obtainable elsewhere. A greater portion of the year is available, with less interference from air currents. This certainty of having clear weather at any given time is of the utmost importance.

The course in Astronomy is arranged especially to draw attention to these advantages, and, at the same time, to give that understanding of the motions of the earth and planets which is so important in many branches of engineering. The four and one-fourth inch Brashear telescope of the University will always be available for closer study of the heavenly bodies. An excellent clock with electric connections for transmitting time gives opportunity for longitude, latitude and time observations. It is hoped in the coming year to install other instruments that will take advantage of the exceptionally favorable conditions so peculiar to Arizona.

ASTRONOMY 1, 2. DESCRIPTIVE ASTRONOMY—The study of the sun, moon and planets and other celestial objects, with constant views of their telescopic appearance and discussion of the latest theories of the evolution of the universe and the condition of the planets. This course will include some research work for which the admirable climate affords opportunity. Open to all students, 3 hrs., or an equivalent, both semesters. 6 units.

BIOLOGY.

PROFESSOR THORNBER, MISS TILLMAN.

The courses which follow are calculated to articulate with the work done in biology in the average western high school.

The Desert Botanical Laboratory of the Carnegie Institution of Washington, D. C., is located in the mountains just west of Tucson. In this laboratory, the southwest with its unique and, as yet, little investigated flora, gains what is destined to be one of the important centers of active, scientific research. The research facilities of the laboratory are all that could be desired, and the investigations upon the desert flora will appeal to students of botany from all quarters. In the light of the above, the importance of the Desert Botanical Laboratory to the University of Arizona and especially to this department will be apparent.

BOTANY 1, 2, GENERAL BOTANY—Botany 1 treats of histology and morphology, and Botany 2 of elementary physiology of plants. Bergen and Davis, *Principles of Botany,* is used as a text-book. Open to all students, 4 hrs. or an equivalent both semesters. 8 units.

BOTANY 3, 4. PLANT GEOGRAPHY. Discussion of factors governing plant distribution. Study of habitat and taxonomic groups of the native flora. Opportunity is offered for advanced work. Open to all students having an equivalent of Botany 1, 2. 4 hrs. both semesters. 8 units.

ZOOLOGY 1, 2. GENERAL ZOOLOGY. A comparative study of the representative invertebrate types is made. Parker and Haswell, *Manual of Zoology,* is used as a text-book. Dodge's, *Elementary Practical Biology* is used in the laboratory. Open to all students, 4 hrs. or an equivalent both semesters. 8 units.

CHEMISTRY.

PROFESSOR GUILD (ABSENT ON LEAVE, 1908-9) ASSISTANT PROFESSOR BENNER.

The instruction in chemistry has two main objects in view; first, to promote general culture; and secondly, to introduce students to technical work, especially in mining. The first two years' work in general chemistry. qualitative and quantitative analysis, places the student in a position to take up advantageously the study of mining, agricultural chemistry or metallurgy.

CHEMISTRY 1, 2. Lectures and recitations illustrating the chemical properties of the elements and their compounds. Text-books, Newth, *Inorganic Chemistry,* Elliot and Storer, *Qualitative Analysis* and various reference books. Open to all students who have taken courses amounting to one year each in preparatory chemistry and physics. 4 hrs., or an equivalent, both semesters. 8 units. Professor Guild and Assistant Professor Benner.

CHEMISTRY 3. QUANTITATIVE ANALYSIS—Laboratory practice with lectures and recitations; the work will be chiefly in gravimetric methods of analysis. Open to students who have taken Chemistry 2. 4 hrs., or an equivalent, first semester. 4 units. Assistant Professor Benner.

CHEMISTRY 4. VOLUMETRIC ANALYSIS—A continuation of the work in Chemistry 3, special attention being given to the methods of assaying employed in the West. 4 hrs., or an equivalent, second semester. 2 units, if discontinued March 15th; otherwise, 4 units. Assistant Professor Benner.

CHEMISTRY 5, 6. SPECIAL QUANTITATIVE ANALYSIS—The analysis of water, gases, oils, minerals. Open to students who have taken Chemistry 4. 4 hrs., or an equivalent, both semesters. 8 units. Professor Guild.

*CHEMISTRY 7, 8. ORGANIC CHEMISTRY—Lectures on the carbon compounds; laboratory work in organic analysis and the preparation of organic compounds; vapor density and molecular weight determination. Open to students who have taken chemistry 3, 4. 4 hrs., or an equivalent, both semesters. 8 units.

CHEMISTRY 9. SYNTHETRIC CHEMISTRY—The preparation of pure chemical compounds from the crude mineral products. Open to students who have taken Chemistry 4. 2 hrs., or an equivalent, first semester. 2 units.

*CHEMISTRY 10. PHYSICAL CHEMISTRY—Lectures, Historical introduction leading up to a discussion of modern chemical theories. Open to students who have taken Chemistry 3. 2 hrs., second semester. 2 units.

*CHEMISTRY 11, 12. CHEMISTRY OF THE RARE ELEMENTS—The analysis and synthesis of uranium, molybdenum, tungsten, vanadium and cerium compounds. Open to students who have taken Chemistry 6 and 9. 4 hrs., or an equivalent, both semesters. 8 units.

CIVIL ENGINEERING.

PROFESSOR WATERBURY, MR. KELTON.

The courses in this department have been arranged with special reference to the engineering development of the Southwest. Stress will be laid on surveying, railroad and bridge work, and irrigation engineering. The design throughout the courses is to give the student a thorough and practical knowledge of the essential principles of his profession, and to teach the tech-

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*Omitted 1907-8.

nical practice of the times so far as possible without sacrificing in other directions.

CIVIL ENGINEERING 1, 2 SURVEYING—Use and care of surveying instruments, United States system of land surveys; city surveys; topographical and hydrographical surveying; mine surveying; and earthwork computations. One full half-day each week is devoted to field practice. Lectures, recitations, drawing and fieldwork. Text-book, Johnson, *Surveying*. Open to students who have taken trigonometry. 4 hrs., both semesters and Saturday forenoons. 8 units. Professor Waterbury and Mr. Kelton.

*CIVIL ENGINEERING 4. GEODESY—Size and shape of the earth; latitude, longitude and azimuth formulas; base line apparatus; trigonometric leveling. Lectures and field work. Open to students who have taken Civil Eng., 1, 2. 1 hr., second semester. 1 unit.

CIVIL ENGINEERING 5. MATERIALS OF CONSTRUCTION—The properties and use of stone, brick, lime, cement, concrete, timber, iron and steel. The computation of stresses in prisms, beams, columns, and shafts, lectures, recitations and laboratory work. Text-book, Merriman, *Mechanics of Materials*. Open to students who have taken or who are taking *Mathematics* 5. 3 recitations and 1 2-hour laboratory period per week, first semester. 4 units. Professor Waterbury.

CIVIL ENGINEERING 6. MASONRY CONSTRUCTION—Foundations on hand and in water, cofferdams, cribs, caissons, round and sheet piling, bridge piers and abuttments, retaining walls, dams, arches, the theory and practice in reinforced concrete construction. Graphical methods of determining stability. Open to students who have taken Civil Eng., 5. 3 recitations and 1 3-hour laboratory period per week, second semester. 4 units. Professor Waterbury.

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*Omitted 1907-8.

*CIVIL ENGINEERING 7, 8. MODERN FRAMED STRUCTURES—Stresses in the various types of bridges under different systems of loading; complete design with drawings for a plate girder bridge, and a steel frame building. Text-book, Merriman and Jacoby, *Roofs and Bridges.* Open to students who have taken Civil Engineering, 5. 2 recitations and 2 3-hour drafting periods per week, both semesters. 8 units.

*CIVIL ENGINEERING 9. RAILROAD ENGINEERING—Preliminary and location surveys; simple and easement curves, turnouts and switches; principles of economic location as based upon cost of construction, operating expenses, alignment, and grades; maintenance-of-way. The fieldwork consists of the surveys for a railroad of sufficient length to secure familiarity with the methods of actual practice. Each student makes a complete set of notes, maps, profiles, calculations and estimates of cost. Open to students who have 4 units.

*CIVIL ENGINEERING 10. HYDRAULICS—Velocity and discharge from orifices, weirs, tubes and pipes; flow in sewers, ditches, canals and rivers; measurement of water power; water wheels of various types. Textbook, Merriman, *Hydraulics*. 4 hrs., first semester. 4 units.

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*Omitted 1907-8.

*CIVIL ENGINEERING 12. PRINCIPLES OF IRRIGATION—A study of the present condition of irrigation development in the United States; irrigation legislation; methods of establishing rights to water; a brief reference to the engineering principles relating to the construction and maintenance of canals and reservoirs and the various means of diverting and measuring water for use in irrigation. Prerequisite Civil Engineering 2. 2 hrs., second semester. 2 units.

DOMESTIC SCIENCE AND ART.

MISS TILLMAN.

The courses in Domestic Science and Art are planned for two classes of students: (1) Girls who wish to acquire a knowledge of the household arts in connection with other studies of the preparatory department. (2) College students who receive college credit for the work.

The course for the preparatory students is of a more practical nature, while the college course pays especial attention to the scientific principles underlying the work and pre-supposes the students to have had chemistry and at least one of the biological sciences.

The entire course has for its object the training of the student in the principles of science as applied to daily living thus demonstrating the value of science, economics and ethics in the betterment of the home.

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*Omitted 1907-8.

*DOMESTIC SCIENCE 1, 2. FOOD ECONOMICS—The classification of food stuffs, nutritive and money values; the application of the principles of pure science to the problems of nutrition, dietary work, preservation and preparation. 2 hrs., or an equivalent, both semesters. 4 units.

*DOMESTIC ART 3. TEXTILES—Lectures on textiles, production, properties, manufacture, etc. Laboratory work in hand sewing, drafting of patterns from simple measurements and plain sewing. 2 hrs., or an equivalent, first semester. 2 units.

*DOMESTIC ART 4. HISTORY OF COSTUME—Lectures on the history of costume; the making of patterns from systems; designs, dressmaking, tailor pressing and construction; practical millinery. 2 hrs., or an equivalent, second semester. 2 units.

ECONOMICS.

MR. F. O. SMITH.

ECONOMICS 1, 2. A study of the general principles and laws of economics based upon Seager, *Introduction to Economics*. Special attention is given to the study and criticism of socialism, and the problem of municipal and government ownership of natural monopolies and public utilities. 3 hrs., both semesters. 6 units.

*ECONOMICS 3, 4. A general study of the history and theory of economics based upon Marshall, *Princi-*

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*Omitted 1907-8.

ples of Economics, with lectures and required reading This course aims to acquaint the students with the different modern theories, and economic plans for reform. 3 hrs., both semesters. 6 units.

ENGLISH.

PROFESSOR NEWSOM, MISS LUTTRELL.

The purpose of the courses outlined below is to give a general knowledge of English literature from the fourteenth century to the present time. Chief stress is placed upon the study of the leading authors of the most important periods, though the history of our literature is also traced from age to age. The course in composition aims to develop accurate thought and clear, vigorous expression.

ENGLISH 1 and 2. COMPOSITION—Prescribed for all freshmen. *First Semester*: Short weekly themes corrected and rewritten. Selected readings from English and American writers of prose, with written and oral reports.

Second Semester: Fortnightly themes illustrating methods of narration, description, exposition and argumentation. Hill, *Beginnings of Rhetoric and Composition,* supplemented by lectures. Selected readings and reports thereon as in the first semester. 3 hrs., both semesters. 6 units. Professor Newsom.

ENGLISH 3, 4. NINETEENTH CENTURY PROSE—Primarily for freshmen. From the publication of the Lyrical Ballads to the death of Ruskin (1798-1899.)

***Omitted 1907-8.**

This course deals with the following writers: Scott, Coleridge, Lamb, Landor, Austin, Hazlitt, DeQuincey, Carlyle, Macaulay, Newman, Trackeray, Dickens, Eliot, Ruskin, Matthew Arnold. Weekly papers on assigned topics, lectures and discussions. 2 hrs., both semesters. 4 units. Professor Newsom.

*ENGLISH 5, 6. SHAKESPEARE—For juniors and seniors. The following plays are read: *Midsummer Night's Dream, Romeo and Juliet, Henry V. Merchant of Venice, As You Like It, Twelfth Night, Hamlet, Othello, Lear, Macbeth, Timon, cmpest.* Some attention is given to the development of the Elizabeth drama and to Shakespeare's formative period. At least one play is read from each of the following writers: Lyly, Greene, Peele. Kyd and Marlowe. Lectures and discussions and a thesis of not less than 1500 words. 3 hrs., both semesters. 6 units.

ENGLISH 7, 8. EIGHTEENTH CENTURY LITERATURE—For Sophmores. From the death of Dryden to the publication of the Lyrical Ballads (1700-1798.) This course deals with the following writers: Defoe, Swift. Addison, Steele, Pope, Johnson, Horace Walpole, Burney, Beckford, Goldsmith, Burke. Weekly papers on assigned topics, lectures and discussions. 2 hrs., both semesters. 4 units. Professor Newsom.

*ENGLISH 9. 10. SEVENTEENTH CENTURY LITERATURE—For juniors and seniors. This course deals with Bacon, Milton, Herrick, Donne, Bunyan and Dryden. Weekly papers on assigned topics, lectures and discussions, and a thesis of not less than 1500 words. 2hrs., both semesters. 4 units.

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*Omitted 1907-8.

*ENGLISH 11, 12. POETRY—For juniors and seniors. From the publication of Thomson's *Winter* to the death of Tennyson (1726-1892.) This course deals with the following writers: Thomson, Collins, Gray, Blake, Burns, Wordsworth, Coleridge, Scott, Byron, Shelley, Keats, Matthew Arnold, Browning, Tennyson. Weekly papers on assigned topics, lectures and discussions, and a thesis of not less than 1500 words. 2 hrs., both semesters. 4 units.

ENGLISH 13, 14. CHAUCER—For sophomores and juniors. In this course a large part of the *Canterbury Tales* is read, the *Prologue to the Legende of Gode Wommen,* and some of the minor poems. The course is purely literary and a knowledge of Anglo Saxon is not required. 3 hrs., both semesters. 6 units. Miss Lutrell.

FRENCH.

PROFESSOR TURRELL, ASSISTANT PROFESSOR LIGDA.

FRENCH 1, 2. First semester: Fraser and Squair, *French Grammar* (Part 1I), Aldrich and Foster, *French Reader.* Second Semester: Reading of Daudet, *La Belle Nivernaise,* Labiche and Martin, *La Poudre aux Yeux,* Halevy, *L'Abbe Constantin.* Composition and dictation, with drill on irregular verbs. 5 hrs., both semesters. 8 units. Assistant Professor Ligda.

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*Omitted 1907-8.

FRENCH 3, 4. First Semester: Fraser and Squair, *French Grammar* (Part II.). Merimee, *Colomba or Carmen,* Lamartine, *Graziella,* Sand, *La Mare au Diable* or *La Petite Fadette.* Second Semester: Selected reading of DeVigny, *Cinq Mars,* Canfield, *French Lyrics,* Victor Hugo, *Les Misérables,* etc. Conversation drill using Kron, *French Daily Life.* 5 hrs., both semesters. 8 units. Professor Turrell.

*FRENCH 5. THE CLASSICAL FRENCH DRAMATISTS—Reading of plays of Corneille, Racine and Moliére. Study of history of French literature to the 19th century. 3 hrs., first semester. 5 units. Professor Turrell.

*FRENCH 6. HISTORY OF FRENCH LITERATURE IN THE 19TH CENTURY. Class reading of recent writers as Daudet, Dumas, Zola, Verlaine, Coppée, Rostand, etc. 3 hrs., second semester. 3 units. Professor Turrell.

GEOLOGY.

The courses in Geology are constructed with special reference to the following: 1st, the development of the observational faculties; 2nd training in inductive and deductive reasoning whereby each student discovers for himself the causes for each phnomenon observed; 3rd. practical application of geological principles to mining with special training in structural geology and mapping.

GEOLOGY 1, 2. GENERAL GEOLOGY—Geological processes, their causes and effects. The atmosphere, surface and underground water, the ocean and the ice and snow as geological agents. Earth movements; mountain and continent building; vulcanism. Rocks, their origin and alterations. Structural geology (problems through the entire course.) Short review of the physical history of the earth and correlated life progress. Detailed study of ore deposits.

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*Omitted 1907-8.

Laboratory work is given in connection with the study of rocks, structural geology and ore deposits. Study in the interpretation of scenery and rock structure aided by the stereopticon. Open to students who have taken or are taking mineralogy 1, 2, 4 hrs. a week both semesters, 8 units.

GEOLOGY 3, 4. TOPOGRAPHICAL AND FIELD GEOLOGY—Construction of maps and sections. United States Geological Survey methods of geological mapping. Geological mine mapping and stereography. Two geological maps are required of each student, one of a portion of the Tucson mountains (composed of lava flows) and one of a district in the Rincon mountains (faulted and folded sedimentary rocks.) Prerequisite Geology 1, 2. All day Saturdays, both semesters. 6 units.

GERMAN.

PROFESSOR TURRELL, MRS. HOCHDERFFER.

GERMAN 1, 2. First Semester: Bacon, *New German Course,* complete. Second semester: Reading of easy texts, such as Andersen, *Bilderbuch ohne Bilder,* Storm, *Immensee,* von Hillern, *Hoeher als die Kirche,* Gerstaecker, *Germelhausen.* Composition, dictation and continued grammar drill. 5 hrs., both semesters. 8 units. Mrs. Hochderffer.

GERMAN 3, 4. First Semester: Thomas, *German Grammar* (Part II.) Reading of Meyer-Foerster, *Karl Heinrich,* Heine, poems and *Die Reisebilder,* Lessing, *Minna von Barnhelm.* Second Semester: *Goethe,* Her*mann and Dorothea,* Schiller, *Wilhelm Tell, Maria Stuart.* An outline of the history of German literature will be given during the year. 5 hrs., both semesters. 8 units. Professor Turrell.

GERMAN 5. GERMAN LITERATURE IN THE NINETEENTH CENTURY. The Romanticists and their successors. Class reading of Kleist, *Der Prinz von Homburg,* Grillparzer, *Der Traum ein Leben, etc.* Lectures and library readings. 3 hrs., first semester. 3 units. Professor Turrell.

GERMAN 6. RECENT LITERARY MOVEMENTS IN GERMANY. The rise of nationalism and symbolism. Reading of Wildenbruch, *Harold,* Fulda, *Der Talisman,* Sudermann, *Johannes,* Hauptmann, *Die Versunkene Glocke.* 3 hrs., second semester. 3 units. Professor Turrell.

HISTORY.

PRESIDENT BABCOCK, MR. F. O. SMITH.

In the work in history emphasis is placed on the social and political development, the relation of cause and effect, and the unity of history. The laboratory method is used whenever possible and individual work insisted upon.

HISTORY 1, 2. ENGLISH HISTORY—Gardiner's *Students' History of England* is used as the basis for the work, with much assigned reading and the preparation of reports. Open to all students. 4 hrs., both semesters . 8 units. Mr. F. O. Smith.

*HISTORY 3, 4. AMERICAN COLONIAL HISTORY—A detailed study of the American colonies under Great Britain, and of the United States to the adoption of the Constitution. Lectures, assigned reading and reports. Open to students who have taken History 1, 2. 3 hrs., both semesters. 6 units.

*HISTORY 5, 6. CONSTITUTIONAL HISTORY OF THE UNITED STATES—A detailed study of the formation of the Union and of the political and constitutional history of the United States down to 1856, based on letters and speeches of American statesmen, public documents and special histories. Open to students who have taken History 1, 2. 3 hrs., both semesters. 6 units.

HISTORY 7, 8. GREAT MOVEMENTS IN HISTORY—Lectures, with readings, on the great forces of history and the forms of their manifestation—migrations, religions, political and economic revolutions, etc. 2 hrs. throughout the year. 4 units. President Babcock.

LATIN.

MRS. NEWSOM.

The courses below are open to students who have completed the first three years of Latin in the sub-collegiate department, or an equivalent. Constant, thorough drills are given in technical grammar and prose composition. In reading, the matter is subjected to grammatical, metrical, rhetorical and historical explanation. The study of the text is made the means of mental discipline, of developing the faculties of observation and critical judgment, and of acquiring habits of thoroughness and accurancy.

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*Omitted 1907-8.

LATIN 1, 2. Virgil, *AEneid,* Books V and VI: Livy, Selections, Cicero, *de Senectute, de Amicitia.* Exercises in prose composition. 4 hrs., both semesters. 8 units.

LATIN 3, 4. Tacitus, *Germania* and *Agricola,* Selections from Histories; Horace. *Odes.* 3 hrs., both semesters. 6 units.

MATHEMATICS.

PROFESSOR E. M. BLAKE, ASSISTANT PROFESSOR MEDCRAFT.

MATHEMATICS 1. COLLEGE ALGEBRA—Four hours. per week. GRAPHICAL METHODS. One two-hour laboratory period per week. First semester, 5 units. Assistant Professor Medcraft.

MATHEMATICS 2. ANALYTICAL GEOMETRY—Four hours per week. GRAPHICAL METHODS. One two-hour period per week. Second semester. 5 units. Assistant Professor Medcraft.

Mathematics 1 and 2 are prescribed for first year students in Mining Engineering, Metallurgy, Civil and Mechanical Engineering.

MATHEMATICS 3. DIFFERENTIAL CALCULUS—Prerequisite, Mathematics 2. 3 hrs. first semester. 3 units. Professor Blake.

MATHEMATICS 4. INTEGRAL CALCULUS—Prerequisite Mathematics 3. 3 hrs. second semester. 3 units. Professor Blake.

Mathematics 3 and 4 are prescribed for second year students in Mining, Civil, and Mechanical Engineering and Metallurgy.

MATHEMATICS 5, 6. ANALYTICAL MECHANICS—Prerequisites, Mathematics 4 and Physics 1, 2. 5 hrs., including one laboratory period, first semester. 4 hrs., second semester 9 units. Professor Blake.

Mathematics 5 and 6 are prescribed for third year students in Mining, Civil and Mechanical Engineering.

NOTE—During 1908-09 Mathematics 4, Integral Calculus, and Mathematics 5, Analytical Mechanics are prescribed for third year students.

MECHANIC ARTS.

PROFESSOR HENLEY, MR. KELTON.

The courses in mechanic arts comprise the elements of shop work and drawing. The work consists of lectures, recitations, drawing, tool and machine work. The courses are designed with special regard for the needs of the students in engineering, an effort being made to familiarize the student with the fundamental shop methods, of value to every engineer, rather than to develop the skill of the mechanic.

MECHANIC ARTS 1. MECHANICAL DRAWING—Elements of orthographic projection, making and lettering of working drawings, tracing and blueprinting. Two 3-hour periods a week, first semester. 2 units. Mr. Kelton.

MECHANIC ARTS 2. DESCRIPTIVE GEOMETRY—Church's 17 problems on lines and planes. Two 3-hour periods a week, second semester. 2 units. Mr. Kelton.

MECHANIC ARTS 3. WOOD SHOP—Bench and lathe work, elements of pattern making, use of wood working machinery. Two 3-hour periods a week, first semester. 2 units. Professor Henley.

MECHANIC ARTS 4. FORGE SHOP—Forge work in iron and steel, tempering, case hardening and annealing. 2 three-hour periods a week, second semester. 2 units. Professor Henley.

MECHANIC ARTS 5, 6. MACHINE SHOP—Bench and floor work, drill press, lathe, planer, milling machine, grinder, etc. 2 three-hour periods, both semesters. 4 units. Professor Henley.

*MECHANIC ARTS 7, 8. ADVANCED SHOP WORK—Manufacturing methods, erection of machinery. Open to students who have had Mechanic Arts 1, 3, 4, 5 and 6. Two periods, both semesters. 2 units. Professor Henley.

*MECHANIC ARTS 9, 10. ADVANCED DESCRIPTIVE GEOMETRY—This course is a continuation of Mechanic Arts 1, 2. Church's *Descriptive Geometry*, is the textbook used. The work covers shade, shadow and perspective. Open to all students who have taken Mechanic Arts 1, 2. 2 periods or an equivalent, both semesters. 4 units.

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*Omitted 1906-7.

MECHANICAL ENGINEERING.

PROFESSOR E. M. BLAKE.

MECHANICAL ENGINEERING 2. DYNAMO-ELECTRIC MACHINERY—Theory underlying the generation, transinternal combustion engines, and compressed air machinery. Study of the general structural features and methods of operating the more important types of boilers, steam and gasoline engines. 2 hours and one weekly laboratory period, first semester. 3 units.

MECHANICAL ENGINEERING 2. Dynamo-Electric Machinery—Theory underlying the generation, transmission and utilization of electric currents. Descriptions of the more important types of generators and motors. 2 hours and one weekly laboratory period, second semester. 3 units.

*MECHANICAL ENGINEERING 3, 4. KINEMATICS OF MACHINERY AND ELEMENTARY MACHINE DESIGN. Theory and design of linkages, gears, cams, screws, etc. Three drafting room periods of two hours each per week, both semesters. 6 units.

*MECHANICAL ENGINEERING 5. MACHINE DESIGN—Continuation of Mechanical Engineering 3, 4. Exercises in design particularly directed towards the designing of complete machines. Three drafting room periods of three hours each per week, first semester 4 units.

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*Omitted 1907-8.

*MECHANICAL ENGINEERING 6. MECHANICAL ENGINEERING—Study of power plants and other machinery installations as to arrangement of parts, adaptability to intended work, economy of first cost and operation. Exercises in design of power plants and writing of specifications. As a part of this course, trips will be made to machinery installations in mining districts of Arizona and Sonora, usually one or two weeks in March or April. One lecture and two drafting room periods of three hours each per week, second semester. 4 units.

*MECHANICAL ENGINEERING 7, 8. MECHANICAL LABORATORY—Operation, inspection and testing of boilers, steam and gasoline engines, compressed aid machinery, pumps and electric machinery. One lecture and three laboratory periods of three hours each per week throughout the year. 8 units.

METALLURGY.

PROFESSOR GOODRICH.

METALLURGY 1. INTRODUCTION TO METALLURGY—Physical properties of metals, alloys, thermal treatment of metals, thermal measurements, fuel, refractory materials, metallurgical processes, furnaces, thermochemistry, metallurgy of iron and steel. Seniors in Mining Engineering and Metallurgy. Lectures and recitations, 4 hrs., for 1 month, first semester. 1 unit.

METALLURGY 2. FIRE ASSAYING—Fire assay for

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*Omitted 1907-8.

gold, silver and lead. Bullion assays. 15 hrs, per week, or an equivalent, during March, April and May. Prerequisite, Chemistry 3 and 4. 2 units.

METALLURGY 3. METALLURGY OF GOLD AND SILVER—Stamp milling, chlorination, cyanidation, pan-amalgamation; Patio, Cazo, Fondon, Krohnke and Tina processes, hyposulphite leaching practice, etc. Lectures and recitations. Prerequisites, Metallurgy 1 and 2. 4 hrs., first semester. To be given after completion of Metallurgy 1. 3 units.

METALLURGY 4. METALLURGY OF LEAD AND COPPER—Sampling, receiving, purchasing, roasting; blast furnace methods, reverberatory furnace methods; pyritic smelting, converting, desilveration of base bullion, electrolytic refining, hydro-metallurgy of copper, etc. Lectures and recitations. Prerequisites, Metallurgy 1, 2 and 3. 4 hrs., second semester. 4 units.

METALLURGY 5 and 6. METALLURGICAL LABORATORY—Concentration, amalgamation, cyanidation, chlorination, hyposulphite lixiviation, etc., tests together with mill work. 2 hrs., or an equivalent, both semesters. Primarily for seniors in the course in Metallurgy. 4 units.

METALLURGY 7. ORE DRESSING—Breaking, crushing, separating, concentrating, sampling; mill processes and management. Lectures and recitations. Prerequisites, Chemistry 3 and 4 and Metallurgy 2. 3 hrs., first semester. 3 units.

METALLURGY 8. Metallurgy of zinc, cadmium, nickel, mercury, bismuth, tin, antimony, cobalt, platinum, tungsten, molybdenum. Lectures and recitations. Prerequisites, Metallurgy 1, 2 and 3. 2 hrs., second semester. 2 units.

MILITARY SCIENCE AND TACTICS.

LIEUTENANT MC CLURE.

PRACTICAL COURSE—Infantry Drill Regulations, through the school of the battalion in close and extended order. Advance and rear guards, and outposts. Marches. The ceremonies of battalion review, inspection, parades, guard mounting and escort of colors. Infantry target practice. Instruction in first aid to the injured. Required of all able-bodied male students throughout the Freshman and Sophomore years, except that students who have satisfactorily completed four years of drill at the end of Freshman year may be excused from further work in the department. Elective during the remainder of the course. Juniors who elect this course may receive credit to the extent of two units. Three hours, both semesters.

THEORETICAL COURSE—The Infantry Drill Regulations covered by the practical instruction. The Manual of Guard Duty. Small-Arms Firing Regulations, Parts I, II and VII. The Articles of War. One lecture on camps and camp hygiene. Lectures on other military subjects. Required of all commissioned and non-commissioned officers. One hour, both semesters.

Students claiming exemption from drill will be required to secure a certificate of disability from a physician designated by the faculty, unless the disability is apparent. Those so excused will be required to elect a subject in place of this course. The officers will be appointed from an eligible list determined by examination, both scholarship and class standing being taken into account, according to the principles governing such selection at the United States Military Academy.

Each member of the military organization will be required to provide himself with the regulation uniform upon his entrance. A deposit covering the cost of the uniform should be made upon registration. The uniform consists of cap, coat and trousers of cadet gray cloth trimmed with black braid, and closely resembles the undress uniform of the United States Military Academy at West Point.

MINERALOGY.

PROFESSOR GUILD (ABSENT ON LEAVE, 1908-9,) PROFESSOR TOLMAN (IN CHARGE, 1908-9).

The main object of the course in mineralogy is to familiarize the student with facts and methods that will enable him to determine the character of an ore or mineral by an observation of its physical properties and by the performance of a few simple tests with the blowpipe. The value of such a course cannot be over-estimated, since these quick methods of analysis are frequently needed in the field and mine when recourse cannot be had to a well-equipped chemical laboratory. The course is of value also to the student of general science, since it adds to the pleasure of a day in the mountains or field, and is necessary to full appreciation of the study of geology. The course is not only practical, but the theoretical side of the subject receives attention in mineral optics, crystallography and similar topics.

MINERALOGY 1, 2. Lectures and recitations in crystallography and the classification and uses of minerals; laboratory work in blow-pipe analysis and determinative mineralogy; the study of a type collection of 600 minerals arranged and classified according to Dana. Text-books: Dana, *Text-book of Mineralogy,* and Brush, *Manual of Determinative Mineralogy and Blow-Pipe Analysis.* Open to students who have taken Chemistry 2 and Physics 2. Units are distributed as follows: Crystallography, 2; blow-pipe analysis, 2; descriptive mineralogy, 3.

MINERALOGY 3. Advanced crystallography and microscopic study of the rock-forming minerals. Open to students who have taken Geology 2 and Mineralogy 2. 2 hrs., or an equivalent, first semester. 2 units.

MINERALOGY 4. PETROGRAPHY—The preparation of thin sections of rocks for microscopic study, rock analysis, and the study of a type selection of rocks. Text-book; Harker, *Petrology for Students.* Open to students who have taken Mineralogy 3. 2 hrs., or an equivalent, second semester. 2 units.

MINING ENGINEERING.

PROFESSOR TOLMAN.

In this course attention is largely directed to the economics of mining, and the laboratory work is so arranged that upon the completion of the course the student will have in his notes plans which will be of value in the practice of the profession.

MINING ENGINEERING 1, 2. Ores, their nature and occurrence; locations of claims; mining laws of the important mining countries of the world; prospecting; excavations; tunnels, shafts and methods of timbering; underhand, overhand, square sett, filling and caving methods of mining; pumping; ventilation; transportation; hoisting; installation of machinery and surface improvements.

Methods for undeveloped properties compared with those for developed mines. Mine accounts, cost sheets, stope sheets. assay plans; methods of management, mine sampling and mine reporting. Prerequisites, Mathematics 5, 6, Geology 1, 2. 2 hours and two laboratory periods of 3 hours each, both semesters, 8 units.

MINING ENGINEERING 3. PRACTICAL MINING—Before entering upon the work of the Senior year, all students who are candidates for the degree of B. S. in Mining must have spent at least four weeks in practical underground mining. The fulfillment of this requirement must be evidenced by the certificate of the mine superintendent or foreman, and by notes and sketches of the processes observed, to be presented to the faculty of the School of Mines, and discussed with them.

MINING ENGINEERING 4. MINING EXCURSIONS. In connection with the courses in Mining Engineering.

Metallurgy and Mineralogy, trips will be made to mining districts in Arizona and Sonora, usually one or two weeks in March or April. These trips are required of all candidates for the degree of B. S. in Mining Engineering and metallurgy.

The purpose of these trips is to afford the mining students an opportunity for close study and inspection of mining and metallurgical plans, and of rock formations and of minerals of commercial value. The students are accompanied by two professors, and every effort is made to make the trips of the greatest practical value. The visits are carefully scheduled and notes, with sketches, measurements and photographs are taken, and elaborated into comprehensive reports by each student after the return. These trips are of incalculable assistance to the lecture, text books and draughting room work.

The subjects of special consideration are transportation, both above and below the surface, mine surveying, methods of stoping and timbering, the best treatment for each ore, assaying and furnace charges, smelting practices, concentration of low grade ores, power generation, pumping and water supply, and mill construction.

During April, 1908, the mining district of Silverbell and the metallurgical plant at Sasco were visited in this way. The thanks of the University are due the superintendents of the various plants visited, for their efforts and care in acquainting the students with the works under their management.

MUSIC.

MR. HOOVER.

The department of music was established in September, 1906, with the primary object of furnishing instruction in vocal music, especially in the form of choruses and glee clubs. The work during the year 1907-1908 has consisted of a general chorus open to all students and required of all unexcused preparatory students, meeting twice a week; two glee clubs meeting twice a week (one for men and one for women); and an orchestra meeting twice a week.

Mr. Hoover gave private instruction in both vocal and instrumental work, at the rate of $20 for a term of ten weeks, two lessons per week. The University is not prepared to furnish full opportunities for regular use of pianos for practice. The pianos in the dormitories may be used to a limited extent, provided the practice does not disturb ordinary study.

MUSIC 1, 2. ELEMENTARY CHORUS WORK, consistin of sight reading, elementary theory, training of the ear, and simple chorus work. Open to all students. Two half-hours throughout the year. 1 unit.

MUSIC 3, 4. ADVANCED CHORUS WORK, consisting of theory, harmony, and the heavier choral works. The class will be expected to form a part of the Annual Festival Chorus with the Tucson Choral Club. Open to all students sufficiently advanced to undertake the work. 2 hrs., both semesters. 2 units.

MUSIC 5, 6. GLEE CLUBS AND ORCHESTRA. Separate glee clubs will be formed for young men and young women. Open to all students who show the required proficiency as vocalists or with instruments. 2 hrs., both semester. 1 unit.

PHILOSOPHY.

MRS. STANLEY.

PHILOSOPHY 1, 2. HISTORY OF PHILOSOPHY- A study of the basal concepts and fundamental problems of philosophical thought as developed historically. Lectures, recitations and assigned reading. Text-book, Schwegler, *History of Philosophy.* 3 hrs., both semesters. 6 units.

PHILOSOPHY 3. PSYCHOLOGY—A special consideration of the subject as applied to teaching. Lectures, recitations and collateral reading. Open to Juniors and Seniors. 4 hrs., first semester. 4 units. (Given 2 hrs., throughout the year 1907-8.)

*PHILOSOPHY 4. PEDAGOGY—An account of educational evolution, both as a culture fact in the history of civilization and as foundation for professional work; lectures, giving a brief but comprehensive outline of school systems, a special study of leading educators such as Comenius, Pestalozzi, Froebel, Mann and others; methods of teaching, school management and school law. Arrangements have been made with the Tucson city schools to use the Holliday school as a practice school for this class. Open to students who have taken Philosophy 1. 2 hrs., both semesters. 4 units.

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*Omitted 1907-8.

*PHILOSOPHY 5. LOGIC—Text-book, Jevons, *Logic;* reading from Mill, Hamilton, Thompson and others. Open to Juniors and Seniors. 4 hrs., first semester. 4 units.

*PHILOSOPHY 6. ETHICS—Theoretical and practical ethics; view of the historical development of the science; origin and development of the moral consciousness; application of the principles of ethics to the problems of life. Lectures, discussions and assigned reading. Open to Juniors and Seniors. 3 hrs., second semester. 3 units.

PHILOSOPHY 7. PHILOSOPHICAL PROBLEMS IN GREAT BOOKS. A comparative study of interpretations of life as revealed in masterpieces of the world's literature.

This course is designed to meet the needs of students who cannot afford time for advanced English or Philosophy, as well as to supplement the course now offered in those departments. The programme as planned will include ten great books, viz.: *The Antigone of Sophocles; the Apology of Socrates;* Plato's *Republic; The Book of Job;* Dante's *Divine Comedy; Don Quixote; Les Miserables; Faust;* Tolstoi's *Anna Karenina;* Ibsen's *Peer Gynt.* Lectures and interpretative readings. Open as free elective to all juniors and seniors.

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*Omitted 1907-8.

PHYSICAL CULTURE.

ASSISTANT PROFESSOR LIDGA.

This department is organized to supply the opportunity for such physical work as experience has shown to be necessary under modern conditions, to counteract the effects of close application to mental work, and to favor the attainment by the student body of a high state of physical efficiency.

It is intended that a thorough physical examination, including an examination of the eye, heart and lungs, shall preface the work of every student in physical culture. This examination will be made as soon as possible after the student enters the University and at intervals during his or her course for safety and for determining the results of the work. Anthropometric cards and charts are platted for the students when desired. In special cases the University reserves the right to require a complete physical examination by a designated physician at the expense of the student.

In addition to the regular class drill a certain part of which consists of training and contests in athletic sports, the University is represented by teams in foot ball, baseball, track and field, tennis, and basket ball. Every facility is provided for track and field athletics. The field on the campus contains gridiron, base ball diamond, tennis and basket ball courts, sprinting paths, jumping and vaulting pits.

The course for women consists of systematic exercise for the harmonious development of the entire body, besides a course for the development of grace of movement and the production of symmetry of physique. Special corrective machinery is supplied for this department, so that even the weakest students may be given proper and healthful exercise. Those pursuing this course are required to provide themselves with a gymnasium suit, consisting of a blouse waist and divided skirt with the regulation gymnasium shoes. The suit requires four yards of double width, 54-in. dark blue serge. The waist has a sailor collar trimmed with white braid. The Butterick pattern may be used or ready-made suits may be had at the gymnasium for $3.75.

The plan of work for the men is three-fold; general graded class work, corrective work and elective athletic work. The athletic work is taken in combination with the class work in order that the student by this combination may obtain the best possible development. The corrective work is given under special supervision to all those who are in need of special development, and, also, to those who are unable to do the regular class work.

PHYSICS.

PROFESSOR DOUGLASS.

The object of this course is to acquaint the student with the fundamental physical principles which underlie the higher courses of chemistry, mechanics and engineering. Special attention is therefore given to the study of force and energy, the physics of liquids and gases and heat. Owing to the great modern development of electricity, an important part of the course is devoted to this study. Note books are required in all courses.

PHYSICS 1, 2. GENERAL PHYSICS—Lectures recitations and laboratory work. First semester: Mechanics and Heat with corresponding experiments in the laboratory. Second semester: Electricity, Wave Motion, Sound and Light. The laboratory experiments give prominence to general electrical measurement, but include the study of wave motions and their application to the other subjects. Open to students who have taken a course in elementary physics and Mathematics 1. 2 hrs. and 2 two-hour periods in the laboratory, or an equivalent, both semesters. 8 units.

PHYSICS 3. THERMODYNAMICS AND HEAT—A study of the foundation principles underlying mechanical engineering, latent and specific heats, conductivity, expansion, mechanical equivalent, high temperatures, cycles, entropy, properties of steam, etc. Prescribed for third year in mechanical engineering course. Two 2-hour laboratory periods and one hour for lecture or recitation, or an equivalent, first semester. 3 units.

PHYSICS 4. ELECTRICAL AND OPTICAL MEASUREMENTS—A study of the electrical machines and instruments used in mechanical engineering, and of the optical instruments handled in mining and civil engineering courses. Prescribed for the third year in mechanical and civil engineering courses. Two 3-hour periods, second semester. 4 units.

SOCIOLOGY.

MR. F. O. SMITH.

*SOCIOLOGY 1. ELEMENTS OF SOCIOLOGY—A study of the nature, origin and development of the social forces; a treatment of the phenomena and laws of society as it is, including whatever conduces to or modifies human association. Dealey and Ward, *Text-book of Sociology,* will be used as a guide and supplemented by lectures, collateral reading and reports. Open to Juniors and Seniors. 3 hrs., first semester. 3 units.

*SOCIOLOGY 2. CHARITIES AND CRIME—A consideration of social pathology, including an examination of the origin and nature of the dependent, defective and delinquent classes. A study will be made of the principles and methods of relief; cause of crime, prison systems; juvenile offenders; preventive measures, etc. Guide, Warner, *American Charities.* Prerequisite, Sociology 1. 3 hrs., second semester. 3 units.

SPANISH.

PROFFESSOR TURRELL, MRS. HOCHDERFFER.

SPANISH 1, 2. First semester: Hills and Ford, *Spanish Grammar;* Turrell, *Spanish Reader,* begun. Conversation and oral work. Second semester: Grammar and Reader completed; additional readings with composition work and dictation. 5 hrs., both semesters. 8 units. Mrs. Hochderffer.

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*Omitted 1907-8.

SPANISH 3, 4. First semester. Reading of short stories by Escrich, Taboado, Becquer, etc.; Alarcón, *El Capitán Veneno*. Second semester; Galdós, *Marianela*. Second semester; Valdés, *La Alegría del Capitán Ribot*. Two hours each week throughout the year will be given to composition, letter-writing and syntax, using Umphrey, *Spanish Composition* and Bonilla, *Spanish Daily Life*, 5 hrs., both semesters, 8 units. Professor Turrell.

SPANISH 5. Lectures in Spanish on the history of Spanish literature. The classical Spanish drama. Study of the age of Lope de Vega and Calderón. Reading of Lope, *La Estrella de Sevilla;* Calderón, *Le Vida es Sueño*. 3 hrs., first semester. 3 units. Professor Turrell.

SPANISH 6. Recent Spanish literature, with particular study of the modern drama. Reading of Echegaray, *O Locura ó Santidad,* and *El Gran Galeoto,* Larra, *Patir á Tiempo;* Nuñes de Arce, *El Haz de Leña,* Galdós, *Electra,* etc. 3 hrs., second semester. 3 units. Professor Turrell.

*SPANISH 7. General survey of the literature of the countries of Spanish America. Class reading of Ugarte, *La Joven Literatura Hispanoamericana;* Hills, *Bardos Cubanos,* and various texts. 2 hrs., first semester. 2 units. Professor Turrell.

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*To be given 1908-9.

*SPANISH 8. History of Mexican Literature, with reading of works by the best authors, as included in the *Biblioteca de Autores Mexicanos,* etc. 2 hrs., second semester. 2 units. Professor Turrell.

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*To be given 1908-9.

SHORT COURSE IN AGRICULTURE

This course is offered: first, to meet the demands of prospective home seekers who desire to learn something about the general principles and practices of irrigation farming before engaging in actual farm operations in Arizona. Second: to give the young man who feels that he cannot afford the time or the means to pursue a full college course a brief introduction to some of the most important scientific principles and facts that are the basis of successful farming, before he settles down to his chosen business, as well as to give him a measure of that broad general culture that is always incidental to university life, and which makes so much for good citizenship. Third: to equip young men to take advantage of opportunities and to fill positions demanding more intelligence and skill than ordinary farm labor. Opportunities and positions for young men of such training are now open in Arizona and will become more frequent as the great reclamation projects being carried on are completed. As specific examples may be mentioned: First, the employment at present by the U. S. Reclamation Service and private ditch companies of many ditch superintendents, all of whom need special training for the work. These positions are constantly changing personnel and the number of such men so employed will more than double within the next two years. The positions pay from $75 to

$135 per month. Second, there are vast areas of desert land in Arizona that may be reclaimed by pumping, and the opportunties for development of this kind of irrigation farming have scarcely been touched, but to make the most of such opportunities one will need more mechanical skill and more knowledge of the physical properties of soil than the average farmer possesses. Courses in Irrigation Engineering, Farm Management, Soil Physics, Vegetable Gardening, Orchard Management and Farm Dairying, are especially designed to equip young men to take advantage of these opportunities and positions.

ADMISSION.

Students will be admitted to the short course who have a general knowledge of the common school branches and sufficient maturity in years to understand the value of their time and opportunity. They will be accorded the same privileges, and required to observe the same regulations, as other students registered in the University and resident upon the campus.

EQUIPMENT.

The University is amply equipped with library, laboratory, and green-house facilities, while a leased farm of 23 acres gives opportunity for an abundance of practice in the application of the knowledge gained in class room, library, laboratory, and green house.

The following outline of the course of study indicates the scope of the work done. In addition to the time spent in the class room indicated below, students will be required to work at least two afternoons per week on the farm for which they will be paid at the rate of 20 cents per hour.

First Year.

First Semester.		*Second Semester.*	
Irrigation Engineering	5	Poultry Husbandry	2
Plant Culture and Orchard Management	3	Farm Management	3
Drawing and Shop	5	Home and Market Gardening	3
English	5	Drawing and Shop	5
Botany	3	English	5
		Botany	3

Second Year.

First Semester.		*Second Semester.*	
English	5	English	5
Chemistry	5	Chemistry	5
Farm Dairying and Feeding	3	Soil Physics	3
Algebra	5	Algebra	5
Types of Stock	2	Veterinary Science	2

For details of these courses consult the announcements of courses under the heading of Agriculture.

BUREAU OF MINES AND ASSAYING

A separate department of the School of Mines under the name of "The Bureau of Mines and Assaying" has been established to receive and work ores, and to make assays and analysis of ores, minerals, mineral waters and petroleum.

In accordance with the act of the Legislature of the Territory, approved March, 1897, and amended in March, 1899, assays of ores and minerals are made for the prospectors and miners of Arizona and for others at fixed rates established by the law, and tabulated below. To meet the requirements of this work a special laboratory building of brick has been erected and maintained. It is fitted up as a complete assay office and is provided with a large double brick coke-furnace, a melting furnace and gasoline furnaces in a fire-proof room. There are in addition, a parting and wet assay room, a balance room and offices.

Extreme accuracy and excellency of work are considered of more importance than pecuniary profits. All assays are made in duplicate and if not accordant are repeated. A special expert assayer is employed, and the assays are not made by students, who receive their instruction in the regular laboratories of the University.

The money received for assaying is deposited monthly to the credit of the assay fund, which is used to pay the assayer and the cost of materials and apparatus.

RATES FOR ASSAYING AND CHEMICAL DETERMINATIONS.

COMMON ASSAYS AND CHEMICAL DETERMINATIONS.

One element only.	
Gold, or silver, or copper, or lead, or iron, or insoluble	$1 00
Zinc, or calcium, or magnesium, or sulphur or manganese	1 50
Silicon or chlorine	2 00
Combinations:	
Gold and silver	1 00
Copper and iron, or lead and iron	1 50
Insoluble, copper, and lead	2 00
Insoluble, copper, and iron	2 00
Insoluble, lead and iron	2 00
Insoluble, zinc, and iron	2 50
Insoluble, lead, copper, and iron	2 50
Gold, silver, copper, and lead	2 50
Gold, silver, copper, iron, and insoluble	2 50

SPECIAL CHEMICAL DETERMINATIONS.

One element only:	
Aluminum, or tungsten, or barium, or chromium	3 00
Cadmium, or tin, or arsenic, or bismuth or antimony, or titanium, or sodium, or potassium, or uranium, or phosphorus	4 00

Nickel, or cobalt, or molybdenum, or vanadium	5 00

CHEMICAL ANALYSIS.

Coal and coke analysis, giving moisture, volatile combustible matter, fixed carbon and ash	5 00
The same, including determination of sulphur and phosphorus	7 50
Silicate analysis	15 00
Cement analysis (chemical)	15 00
Cement analysis (mechanical)	2 50
Cement tests (strength and soundness, by the Department of Civil Engineering)	3 00
Boiler water analysis	10 00

RATES FOR TESTING ORES.

Stamp Mill Amalgamation, including sampling, assays, retorting, etc.:

For lots of one ton or thereabouts	$30 00
The same, with concentration of pulp on Wilfley table	30 00
For lots of two tons, without concentration	40 00
For lots of two tons, with concentration	45 00

Smaller Amalgation Tests, including all sampling charges, and concentration after amalgamation:

For small samples up to five pounds	$7 00
For small samples, five to twenty-five pounds	10 00
For small samples, twenty to one hundred pounds	15 00

In these smaller tests, the sample is ground to pass a suitable mesh, and is agitated with mercury. The mercury is panned out, retorted, and the values determined in bullion. The values in the concentrates and tailings are also determined. The number of tests necessary to determine the adaptability of any ore to treatment in cyaniding varies so greatly that no general rates can be offered.

CONSIGNMENTS, REMITTANCES, ETC.

Samples, ores, and other consignments should be shipped to the University of Arizona, the School of Mines, Tucson, Arizona. Small quantities may best be sent by mail, at the rate of one cent per ounce; larger quantities by express or by freight. The Wells-Fargo Express Company makes daily deliveries at the University.

All assays, chemical determinations and chemical analysis, except gratuitous qualitative tests mentioned elsewhere, must be paid for in advance.

No determination of any kind will be made until the required payment arrives. Remittances should be made by post-office money order, Wells-Fargo money order, bank draft, or check on a Tucson bank, payable to K. C. Babcock, President, University of Arizona, to whom also business communications relating to matters discussed in this circular should be addressed.

AGRICULTURAL EXPERIMENT STATION

STAFF.

KENDRIC C. BABCOCK, Ph. D.
President of the University
ROBERT H. FORBES, M. S. - Director and Chemist
JOHN JAMES THORNBER, A. M. - - - Botanist
ROBERT W. CLOTHIER, M. S. - - Agriculturist
J. ELIOT COIT, PH. D. - Associate Horticulturist
ALBERT EARLE VINSON, PH. D. - Associate Chemist
FREDERICK W. WILSON, B. S. - - - - -
- - - - - - Associate Animal Husbandman
WILLIAM B. McCALLUM, PH. D. Associate Botanist
WILLIAM H. ROSS, Ph. D. - - Assistant Chemist
T. D. A. COCKRELL, - - Consulting Entomologist
WILBUR O. HAYES, - - - - Secretary

ORGANIZATION AND WORK.

The Agricultural Experiment Station is a legally constituted department of the University, whose purpose is to "aid in acquiring and diffusing * * * useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and applications of agricultural science."

With the above objects in view, the organization of the station includes the departments of administration, agriculture and horticulture, animal husbandry, botany, and chemistry, the whole or a major portion of the time of one or more members of the station staff being devoted to each department of the station work. Provision is made for meterological work also, though to a less degree.

Owing to the wide variation in agricultural conditions in Arizona, it has been found of advantage to distribute the work so that each department is located, so far as possible, in that region most favorable to the accomplishment of its own special results. According to this principle, the various lines of Experiment Station work have been distributed as follows:

The Director's office and the departments of botany and chemistry are maintained at Tucson in the University buildings. Through this arrangement the Experiment Station profits by the buildings and libraries of the University, while the University is benefitted from time to time by the teaching ability of members of the Station staff. It has been found that from this base of operations the three great agricultural districts of the Territory—Salt River valley, the lower Colorado and the upper Gila—are accessible with equal convenience for field work and observations.

On the same ground—fitness of location for the work undertaken—the Experiment Station farm has been maintained and strengthened at Phoenix. Salt River Valley is intermediate in elevation, in situation, and in mean yearly temperature between the other two important farming districts above mentioned, and for this reason the agricultural and horticultural results obtained there are capable of the most general application in the Territory at large.

On the same principle again, the date palm orchard, conducted in co-operation with the United States Department of Agriculture, is located in the alkaline district south of Tempe, where a successful demonstration of this palm as a commercial fruit producer will be of the greatest value, creating use for great areas of alkaline land in the arid southwest. Another orchard has also been planted on a tract near Yuma.

The range station also, for the study of worn-out range country with a view to its reclamation to usefulness, is located in a typical district near Tucson, and is conducted under the auspices of the department of botany, co-operating with the United States Department of Agriculture.

The services of specialists in various subjects, such as entomology, meteorology, and soil survey work, have also been secured from time to time.

The results of the Experiment Station work are made public at frequent intervals in the bulletins and reports of the Station. These publications are made in two series: First, the longer and more technical bulletins, stating in considerable detail the investigations as they mature; and, secondly, the Timely Hints for Farmers, which are brief writings issued at the time when they will be most useful, written in plain language, and presented in popular form. The annual reports, also, are for the most part written popularly, and afford a convenient and reliable summary of each year's work as it comes to completion.

The Experiment Station work conducted and published on the lines indicated above has a two-fold value. In the first place the suggestions made or derived from the investigations of the Station are of direct material profit to the agricultural public and are intended to be immediately applied to advantage in the betterment of agricultural practice. In the second place, these writings are intended to serve an educational purpose, inasmuch as they are so presented as to constitute lesson sheets for the benefit of the careful reader. It may, therefore, be considered that the Experiment Station reaches a class of some thirty-five hundred readers in the Southwest at frequent intervals by means of its Timely Hints" and other publications. The operations of the range study tract at Tucson, the Experiment Station farm at Phoenix, and the date palm orchards at Tempe and Yuma serve also as an object lesson to the adjacent public.

It is believed that this distributed and mobile organization is especially effective, not only for the purposes of the Experiment Station, but also for those of the University as well, since it allows the station to conduct its work in localities suitable for the accomplishment of results; and, again, it causes the public to become better acquainted with the Territorial University, of which the Station is a department.

Appropriations of $11,000, made for the use of the Station by the Twenty-second Legislature, and of $2800 and $5600 by the two succeeding Legislatures very satisfactorily attest the estimation in which the work of the Station is held. The appropriations were made for the improvement of the date orchards, for purchasing live stock and buildings for the farm; for issuing publications, and for holdings farmers' institutes and short courses of instruction throughout the Territory.

Provision, therefore, is made for the symmetrical development of this work in the Territory, both experimentally and educationally; and, prospectively, "the farmers' college" bids fair to increase in usefulness to the growing agricultural interests of the Territory.

PREPARATORY DEPARTMENT

KENDRIC CHARLES BABCOCK, Ph. D., President, Civics.

SIDNEY CARLETON NEWSOM, A. M., Acting Principal.

INSTRUCTORS.

CHARLES ALFRED TURRELL, A. M., French, German, Spanish.

WILLIAM WHEELER HENLEY, A. B., Shopwork and Drawing.

LIEUT. SAMUEL V. McCLURE, Military Science and Tactics.

WILLIAM GEORGE MEDCRAFT, A., M., Mathematics.

ANDREW ELLICOTT DOUGLAS, A. B., Science.

LEVONA PAYNE NEWSON, Ph. D., Latin.

VICTOR LIGDA, B. S., Physical Training and French.

ESTELLE LUTRELL, A. B., English.

RAYMOND C. BENNER, M. S., Chemistry.

FREDERICK E. TALMAGE, B. L., Bookkeeping, Stenography, Typewriting.

OPAL I. TILLMAN, B. S., Domestic Science.

IDA C. REID, Ph. B., Mathematics and History.

MARY J. HOCHDERFFER, A. B., Spanish, German, Eng-English.

ESTHER E. LAPE, A. B., English.

F. O. SMITH, M. A., LL.B., History, English.

F. C. KELTON, B. S., Drawing.

GENERAL INFORMATION.

In this department the University offers the work of a well-organized, four-years high school, with the added advantages of shopwork and drawing, domestic science, and military drill. The general library and gymnasium are open to all students in this department.

The equipment of the scientific laboratories is available for use in this preparatory work,, whenever it can be used advantageously, and makes possible strong work in elementary science. The instructors in this department are assisted by the professors of the college departments, several of whom regularly conduct preparatory classes. By reference to the course of study which follows, it will be seen that it offers a comprehensive training for those who may not be able to pursue their studies farther, while it gives a good preparation for college.

ADMISSION.

Admission to regular standing in the first year of the preparatory course presupposes the completion of the work of the eighth grade of the public or parochial schools. Students who do not bring certificates showing the completion of this work, must take examination to test their ability to pursue profitably the work of the first year.

The Board of Regents on April 10, 1906, voted that after September 1, 1906, no pupils who have not completed the work of the ninth grade (or the first year of a high schoool) should be admitted into the

University from cities in Arizona having more than 5,000 population.

All students entering the preparatory department will be required to take an examination in oral reading. To remedy notable deficiency in this subject, the University will require extra work in addition to other studies.

In all cases in which the preparation of a student in a particular subject proves to be deficient, the University reserves the right to require the student to secure at his own expense the help of an approved coach until the deficiency is remedied.

LIVING ACCOMMODATIONS AND EXPENSES.

One dormitory, South Hall, is set apart for the use of male preparatory students; details of furnishings, living expenses, etc., are set forth in a paragraph earlier in this Register. These expenses are substantially the same for both college and preparatory students, save that laboratory fees and book bills are higher for the former. The expenses necessarily incurred during the academic year are about $250, but of this amount nearly one-third falls due in the first month, or in the six weeks before November 1st, in the form of charges which are made but once during the year or but once during the stay of the student in the University. The following are the ordinary expenses of the first month:

Matriculation	$ 5.00
Dormitory deposit—Maintenance fee	3.00
Mattress, blankets, pillows, sheets, etc., (unless brought from home by the student)	15.00
Board for first month, including napkin fee	17.50
Books	6.00
Shop and Drawing fee	5.00
Military uniform	16.25
	$67.75

The dormitory is placed in charge of two resident instructors, assisted by a committee of five students. Inspection of rooms is made in the morning and in the evening by the head of the dormitory. The hours from seven to quarter past nine in the evening are observed as study hours except on Fridays and Sundays. Students under twenty-one years of age are required, unless relieved by the president, to obtain permission to leave the Campus, or to leave the dormitory during study hours, except on Sundays from nine to twelve A. M., Wednesdays, four to seven, P. M., and Fridays, four to six P. M. Breaches of the regulations of the dormitory are punished by "extra study"—labor about the buildings or grounds—by confinement to rooms, or by expulsion from the dormitory; for damage to University property, a money penalty is imposed.

COURSE OF STUDY.

The following course of study will be required of all students who fit themselves at the University for entrance to the Freshman class in 1908. Such variations from it will be made during the next year as will adapt it to the case of students already in the subcollegiate department who took part of their work under the former requirements.

Military drill is required of all able-bodied male students throughout the course. Physical training is required of all students, unless they are excused by the President upon presenting a certificate from one of the University physicians. The young men have drill three times per week and exercise in the Gymnasium twice. The young women have physical culture three times a week.

The language begun in the second or third year must be pursued for at least two years in order to secure credit towards graduation.

Though the subjects are for convenience grouped by years in the following schedule, the departmental method is followed. In the description of courses, the subjects are arranged by groups or departments in the consecutive order in which they are taken up and students will be required to take them in this order. Aside from this sequence the ability of each studnt must determine what subjects will be pursued at any given time, due regard to be given to the proper balance of subjects. The wishes of parents will always be given careful consideration in making up the schedule of work for each student, but the final decision in the matter must rest with the committee on registration, which is composed of persons who have had long experience in secondary and collegiate teaching. Individual attention will be given to the needs of each student.

To each student who completes the studies of this course receiving a total of sixteen units (a unit representing a subject pursued for one year with five, or four, recitation periods per week), a certificate stating that fact will be given.

This certificate will entitle the holder to admittance to the corresponding University courses of instruction without examination.

Subjects thus marked * are elective. Five hours of elective must be chosen in the scond year. In the third year and in the fourth year, electives making up at least nine hours must be chosen.

FIRST YEAR.

English	5	Drawing and shop work, or Domestic Science	5
Algebra	5	English	5
Greek and Roman History	3		
Physical Geography	3		

SECOND YEAR.

English	5	*Latin (first year)	5
Algebra	5	*German (first year)	5
European History	5	*French (first year)	5
*Botany	5		

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*Subjects thus marked are elective. Five hours of elective must be chosen in the second year. In the third year and in the fourth year, electives making up at least nine hours must be chosen.

*Spanish (first year)..5
*Bookkeeping (7 hrs).5
*Drawing and shop work, or Domestic Science.5

THIRD YEAR.

English 5
Plane Geometry 5
*Chemistry 5
*Latin (second year)..5
*Greek (first year)....5
*French (first year)...5
*French (second year).5
*German (first year)..5
*German (second year).5
*Spanish (first year)..5
*Spanish (second year).5
*Stenography 5

FOURTH YEAR.

English 5
American History and Civics 5
*Solid Geometry (first half) 4
*Trigonometry (second half) 5
*Physics 5
*Latin (third year)...4
*Greek (second year)..5
*French " " 5
*German " " 5
*Spanish " " 5

ENGLISH.

The English of the preparatory course is based upon what is known as the entrance requirements of New England colleges. The work is in general divided into three parts: Classics, studied in class, composition and grammar work done partly in class and partly outside, and supplementary reading done largely outside the class room. All these parts of the work may be carried on at the same time, as the circumstances of the class

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*Subjects thus marked are elective. Five hours of elective must be chosen in the second year. In the third year and in the fourth year, electives making up at least nine hours must be chosen.

seem to require, the classics and supplementary reading forming the basis of a large part of the work in grammar and composition. Throughout the course, however, a primary aim is to develop the student's individual power of expressing himself in words. The time allotted to these three phases of English varies from year to year, increasing attention being paid to the appreciative and critical faculty as the course advances. In the fourth year a brief outline history of English and American literature occupies about one-third of the year's work in English.

Five hours each week throughout the course are given to English. According to the following general outline, selections from the list below are made at the discretion of the teacher, preference being given to the New England College Entrance Requirements, which are marked by an asterisk*.

FIRST YEAR.

ENGLISH GRAMMAR AND COMPOSITION receive one-half of the time of the first year.

CLASSICS. Longfellow's Tales of a Wayside Inn; Bryant's Water Fowl, Planting of the Apple Tree, Forest Home, the Antiquity of Freedom; Lowell's shorter poems; Tennyson's Enoch Arden, Miller's Daughter.

SUPPLEMENTARY READING. Talisman, Tom Brown at Rugby, Last of the Mohicans, The Sketch Book, The Man Without a Country, The House of Seven Gables, *Ivanhoe.

SECOND YEAR.

COMPOSITION AND GRAMMAR. As in the first year with attention to figures of speech, reproducing the work of classic authors, elementary etymology, exercises in exposition, narration and description.

CLASSICS. *The Vision of Sir Launfal, *The Ancient Mariner. The Ballad Book (Bates), Sohrab and Rustum and *The Idylls of the King, studied as in first year.

SUPPLEMENTARY READING. Deserted Village, Lorna Doone, Tale of Two Cities, Life of Goldsmith, Quentin Durward, The Cricket on the Hearth.

THIRD YEAR.

Composition and Rhetoric are continued with emphasis on elementary argumentation and exposition.

CLASSICS. Julius Caesar,, *The Merchant of Venice, The Princess, *Sir Roger de Coverly, Poems of Burns, Carlyle's Essay on Burns. These are for general reading as in the first and second years. For careful reading are the following: *Milton's L'Allegro, Il Penseroso, Comus, Lycidas; *Macaulay's Essay on Milton. Special attention will be given to the author, his times and surroundings, and his style.

SUPPLEMENTARY READING. Sesame and Lilies, Backlog Studies, Treasure Island, Kidnapped, Silas Marner, Alhambra.

FOURTH YEAR.

COMPOSITION AND GRAMMAR. Exercises in narration and description for flexibility and ease of expression and general preparation for entrance requirement "b" on page 44 of this Register.

CLASSICS. *Burke's Speech on Conciliation; Macaulay's *Life of Johnson, Essay on Addison; *Macbeth The Tempest, Midsummer Night's Dream. These are all for thorough study.

HISTORY OF ENGLISH LITERATURE. From the earliest times, with text-books as guides, with a review in chronological order of the classics studied during the four years of the course, to prepare for examination in entrance requirement "a" on page 44 of this register. Special attention is paid to Keats, Shelley, Tennyson and other representative poets of the nineteenth century.

SUPPLEMENTARY READING. *Vicar of Wakefield, The Making of an American, The Newcomes, Oliver Twist, American Orations and Addresses.

MATHEMATICS.

FIRST YEAR.

ALGEBRA. Introduction, factoring, fractions, simple equations, simultaneous equations, and special problems.

SECOND YEAR.

ALGEBRA. Involution, evolution, theory of exponents, radicals, quadratic equations, and proportion.

After 1907 but two years will be devoted to preparatory algebra. The two years' work will be required for entrance to college.

THIRD YEAR.

Plane geometry, including thorough work in original exercises.

FOURTH YEAR.

First semester, solid geometry with original exercises. Second semester, plane and spherical trigonometry.

MECHANIC ARTS.

This work consists of both drawing and shop work, between which subjects the student's time is about equally divided. The course covers two years and is designed to furnish a thorough elementary knowledge of manual training as taught in the secondary schools of the country.

FIRST YEAR. Drawing—Freehand sketching in perspective and orthographic projection. Reinhart's lettering, free-hand working drawings.

Shop work—"Sloyd," care and use of woodworking tools.

SECOND YEAR. Drawing—Mechanical Drawing and geometrical problems.

Shop work—Forging, joinery, wood-turning.

SCIENCE.

It is the object of the courses in science to initiate the student into the processes and methods used in laboratory work; to teach close observation, careful manipulation and logical deduction; to acquaint the student with the fundamental facts of the various branches of science and to give full practice in the use of good

English in describing various observations and experiments. To insure better results in the notebooks, they will all be passed upon by one of the instructors in English.

BOTANY. A year's work is offered in beginning botany, being largely with living plants. Simple and compound microscopes are provided, and students are required to keep careful notes on laboratory work and experiments. The work is supplemented with lectures and a text-book.

PHYSICAL GEOGRAPHY—This course,, combining the laboratory method with the textbook, aims to give the pupils training in exact observation of familiar phenomena, like distance, weight, pressure of liquids and gases, temperature, winds, clouds and the habits of plants and animals. The natural forces producing erosium, formation of soil, and rocks, the processes of nature as seen in seed germination and plant growth (with demonstrations with the microscope) will be discussed, with frequent experiments and field excursions. The entire country within reach of the University is a great natural laboratory, full of interest and information for all. The course explains these features which become so familiar to everyone residing here.

CHEMISTRY. A year's work with the text and in the laboratory, in such proportions as the instructor decides upon. Each student must keep a note-book in which he describes the process and results of his laboratory work.

Physics. The course aims to show that physics is not something abstract or mysterious, but is the simple explanation of everyday occurrences not usually understood and often unnoticed. It consists of three recitation periods and four laboratory periods per week, carried on along the lines laid down for the senior year in secondary schools. Each student must keep a notebook in which a minimum number of experiments must be written up.

DOMESTIC SCIENCE.

The course in domestic science for young women is arranged to give instruction in the science and art of home economics, and to raise home-making to a higher plane.

Sewing. The making of laboratory uniforms, plain undergarments and dresses, with talks on materials and implements used; use of machines with simple attachments. Three periods per week through the year.

Cooking. Practical work in the preparation of food, with study of the food principles and the effect of heat upon each proper combination in a well-balanced diet. Two periods per week through the year.

HISTORY.

The aim of the work in history is to lead the pupil to see the development of races and nations along political, social and religious lines, and to arouse in him a love for the subject and a habit of broad and discriminating reading.

The work of the first year consists of a survey of the development and characteristics of the Greek and Roman civilizations. A text such as Wolfson, *Essentials of Ancient History,* or West, *Ancient History,* will be supplemented by collateral reading and a note-book.

The work of the second year includes mediaeval and modern history. The aim is to give the students an idea of the essential unity of history and the leading facts in the political development of races and nations. Harding, *Essentials of Mediaeval and Modern History,* is used, supplemented by the reading of references contained therein.

Hart,*Actual Government,* is the text-book in civics The historical development of the subject is made prominent while practical problems, such as taxation and municipal government, are made the subjects of special investigation and study. The text in history will be Channing, *Student's History of the United States.*

LATIN, GREEK, FRENCH, GERMAN AND SPANISH.

For an outline of the courses in Latin and Greek see page 46, under requirements for admission.

For an outline of the courses in French, Spanish and German see pages 67, 89, 69.

BOOKKEEPING AND COMMERCIAL PRACTICE.

Bookkeeping is taught by the modern budget system. The work is individual and each student may progress as fast as his time and ability permit. The course is thorough in all the details of office practice.

Students are made familiar with different filing cabinets, the filing of letters, the use of card ledgers, the copying and indexing of letters and bills in copy books. The course includes instruction in commercial law, with special emphasis laid on the ordinary forms of commercial paper and the different endorsements. The department is equipped with the latest vertical files, cabinets, letter press and office sundries. All students in bookkeeping are required to take some other branch of mathematics and must show proficiency in English.

STENOGRAPHY AND TYPEWRITING.

A complete course in stenography is offered. The Gallagher-Marsh system, a system which has received the highest endorsement of leading court reporters on the Pacific coast, and which has been adopted by the Boards of Education in the largest cities of California, has recently been adopted. The amount of time allotted for this work has also been increased from five hours to eight hours per week. The object of the course is to train students so that they may become practical stenographers. With this end in view particular stress is laid upon neatness, filing, copying and indexing. This branch of the commercial department is equipped with up-to-date filing cases, office sundries, and six typewriters, four of which are Remingtons, one an Oliver and one the L. C. Smith Visible. Five of the typewriters are new. *Students taking this work are required to have had one year of high school English, and to take English with this course.*

ALUMNI ASSOCIATION

The Alumni Association of the University of Arizona was organized on the second day June, 1897.

The object as expressed in its constitution is: "To promote the interests of the University, to secure unity among its graduates and to foster an attachment to our Alma Mater."

Concerning the last two clauses of this declaration it may be said that the organization is carrying out its meaning in a manner which leaves little, if anything, to be desired. There is no doubt regarding the loyalty of the graduates to the University of Arizona and no question of their unanimous desire for the prosperity of the institution.

The first clause in the above declaration, however, deals with a matter which in a sense admits of more growth than those just mentioned, and the members of the association realize that there is room for further progress in the accomplishment of this purpose.

It will be the aim of the alumni association to create a deeper feeling of interest and pride in the University of Arizona among the people of the Territory.

1895.

*Charles Oma Rouse, B. S.

Mercedes Anna Shibell, B. S., (Mrs. A. J. Gould), Tucson, Arizona.

---

*Died, 1906.

Mary Flint Walker, B. S., (Mrs. Pearl Adams), Benson, Arizona.

1897.

Edward Marshall Boggs, C. E., (nunc pro tunc), Chief Engineer Oakland Electric Railways, Oakland, Cal.

Clara Cramond Fish, B. S., (Mrs. F. C. Roberts), Phoenix, Arizona.

George Ojeda Hilzinger, B. S., Teller in Bank, El Paso, Texas.

Mark Walker, B. S., Metallurgist, Los Angeles, California.

1898.

Hattie Ferrin, B. S., (Mrs. Charles Solomon), Safford, Arizona.

Granville Malcolm Gillett, B. S., Draughtsman in Surveyor General's Office, Phoenix, Arizona.

Minnie Watts, B. S., (Mrs. W. B. Smith), Altaville, California.

*John Desha Young, B. S.

1899.

Robert L. Morton, B. S., Assayer, Yuma, Arizona.

1900.

Ida Clarissa Flood, B. S., (Mrs. G. Dodge), Oakland, California.

Samuel Pressly McCrea, B. S., A. B., Principal of High School, Redwood City, California.

---

*Died April 8, 1899.

Charles Pierce Richmond, B. S., Cyanide Manager, La Union, Salvador, Central America.

Florence Russell Welles, B. S., (Mrs. Wm. Angus), Los Angeles, California.

1901.

Rudolph Castaneda, B. S., Surveyor, Tucson, Arizona.

Clara Ferrin, B. S., Teacher, Tuscon, Arizona.

George Millard Parker, B. S., Denver, Colorado.

David Hull Homes, B. S., (nunc pro tunc), Architect, Tucson, Arizona.

1902.

Andrew Gilbert Aiken, A. B., B. S., Surveyor, Canton, New York.

Moses Blumenkranz, B. S., Assistant Superintendent Shannon Copper Company, Metcalf, Arizona.

Ruth Brown, Ph. B., (Mrs. Wilkins Manning), Tucson, Arizona.

Felix Grundy Haynes, B. S., Casa Grande, Arizona.

Rose Belle Parrott, Ph. B., Teacher, Roseburg, Oregon .

Philip Matthew Reilly, B. S., Mining Superintendent, Cumpas, Sonora, Mexico.

Bertram L. Smith, B. S., Assayer, Silver Bell, Arizona.

Bessie Smith, Ph. B., (Mrs. Earle Davis), Douglas, Arizona.

Walter James Wakefield, Cashier, Tucson, Arizona.

1903.

Advanced Degrees:

LL. D., Hon. William Herring, Tucson, Arizona.

M. A., John William Gorby, B. A., (Marietta), Chicago, Illinois.

M. A., Benjamin Franklin Stacey, B. A., B. D., (Lombard), Teacher, Pasadena, California.

Richard Lamar Drane, B. S., Chief Draughtsman, G. V., G. & N. Ry., Tucson, Arizona.

George Mark Evans, LL. B., (Michigan), Ph. B., Teacher, Santa Ana, California.

Leslie Alexander Gillett, B. S., (Mining), Draughtsman, Surveyor General's Office, Phoenix, Arizona.

Georgia Ann Holmesley, Ph. B., Teacher, Clifton, Arizona.

Edward Horton Jones, B. S., Assayer, Magdalena, Sonora, Mexico.

John Williard Prout, Jr., B. S., Superintendent Mowry Mine, Patagonia, Arizona.

Thomas Edward Steele, B. S., Assayer, La Cananea, Sonora, Mexico.

1904.

William Burnham Alexander, B. S., Civil Engineer, Tucson, Arizona.

Elbert John Hollingshead (Kimble), B. S., Los Angeles, California.

Frank Caleb Kelton, B. S., Instructor in Civil Engineering, Tucson, Arizona.

Estella Markham Prout, Ph. B., Denver, Colorado

John Williard Prout, Jr., B. S., (Mining). See 1903.

1905.

Ora Elinor Norway, Ph. B., Patton, California.

1906.

Advanced Degree:

M. S., William B. Begg, A. B. (Toronto).

Chester Bennett Clegg, B. S., (Civil Engineering), Draughtsman, Roosevelt, Arizona.

John Wesley Gebb, B. S., (Mining), Silverbell, Arizona.

Roy Bartley Kilgore, B. S., (Mining), Seattle. Washington.

Roy Gibbons Mead, B. S., (Mining), Los Angeles, California.

Roy Webb Moore, B. S., (Mining), Tucson, Arizona.

Carobel Murphey, A. B., (Cox College), Ph. B., Teacher, Tucson, Arizona.

Ida Christina Reid, Ph. B., Instructor, University of Arizona, Tucson, Arizona.

Minnie Louise Wooddell, Ph. B., Teacher, Tucson, Arizona.

1907.

Advanced Degree:

Engineer of Mines, John Willard Prout, B. S., B. S., (Mining.)

Charles Alexander, Ph. B., Teacher, Tempe, Arizona.

Harriet Estella Brown, Ph. B., Teacher, Tucson, Arizona.

Lawrence Brodhead Croasdale, B. S., (Mechanical Engineering), Draughtsman, Tucson, Arizona.

Weda Ina Purcell, Ph. B., Teacher, Tucson, Arizona.

Hugh Maupin Wolflin, B. S., University of Arizona, Tucson, Arizona.

MILITARY ORGANIZATION
1907-8

UNIVERSITY OF ARIZONA CADET BATTALION.
NATIONAL GUARD OF ARIZONA.

Commandmant of Cadets
Lieutenant Samuel V. McClure, U. S. A.; Major, N. G. A.

STAFF.

Adjutant	First Lieutenant John H. Culin
Sergeant Major	Howard W. Estill

COMPANY A.

Captain	Leslie C. Millar
Acting First Lieutenant	John H. Culin
Second Lieutenant	Charles A. Button
First Sergeant	J. Malcolm Henry
Sergeant	J. Urbano Salazar
Sergeant	Ben H. Clark
Corporal	Sidney R. Jones
Corporal	Homer B. Batte
Corporal	George Nishihara

COMPANY B.

Captain	Warren A. Grossetta
First Lieutenant	Rollin Brown
Second Lieutenant	Ernest O. Blades
First Sergeant	Alvan C. Gillem
Sergeant	Charles A. Firth
Sergeant	R. Jackson Weeks
Corporal	John C. McClure
Corporal	Charles Roletti
Corporal	Kenneth B. Brown

TRUMPETERS.

Sergeant	Sidney F. Mashbir
Corporal	Julian Huddleston
Private	Oney Anderson
Private	Ralph Rigg

COLOR GUARD.

Color Sergeant	H. Oliver Coles
Color Sergeant	Guy Emmons
Acting Corporal	D. Leslie Wooddell
Acting Corporal	William R. Campbell

At the annual Military Competitive Drill, June 1907, Cadet Howard W. Estill won the University medal in the individual competition.

REGISTER OF STUDENTS

GRADUATES.

Carpenter, Miles Miller, B. S., Texas Agricultural College,	Tucson
Edelsteen, Karl Johan, University of Kristiania.	Tucson
Orr, Samuel James, B. A., University of Colorado.	Boulder, Col.
Stebbins, Lillian Brownell, B. A., University of Minnesota	Tucson
Whiting, Edward Blake, B. S., Yale University.	New Haven, Conn.
Whitwell, Mrs. Florence Nye, Columbia University	Tucson

SENIORS.

Bradstreet, Carroll Pitkin	New York City
Chapin, Theodore	Flagstaff
Dinsmore, Benjamin Scott	Tucson
Tarr, William Arthur, B. S., Oklahoma Agricultural and Mechanical College	Tucson
Worthing, Leigh Ernest	Traver, Mich.
Wolflin, Hugh Maupin, B. S., University of Arizona	Tucson

JUNIORS.

Burnham, Roderick Deane	Pasadena, Cal.
Harwick, Ralph N.	Buffalo, N. Y.
Hatcher, Burrel R.	Douglas
Henderson, John Harry	Arkadelphia, Ark.
Johnson, Orville Morris	Lincoln, Neb.
La Baree, Grace Ysabel	Tucson
Macauley, Frederick Robertson	Montreal, Canada
Osborn, W. Scott	Phoenix
Post, Anita Calneh	Yuma
Ruthrauff, John Mosheim	Tucson
Thompson, Arthur Perry	Phoenix
Wilkerson, Mabel	San Bernardino, Cal.

SOPHOMORES.

Barnes, Frank Eugene	Morris City, Ill.
Behr, Ernest Edward	Pasadena, Cal.

Blades, Ernest Orrin	Roosevelt
Calloway, Lawrence Arthur	Tucson
DeFoe, Arthur Douglas	Bay City, Mich.
Doan, Fletcher Morris, Jr.	Tombstone
Grossetta, Warren Arthur	Tucson
Hoyt, Joseph Clyde	Jerome
Newton, Raymond Austin	Patchogue, N. Y.
Sanford, Chard Oliver	Los Angeles, Cal.
Tarr, Coralynn Gertrude	Tucson

FRESHMEN.

Doty, John, Jr.	Richmond, N. Y.
Farish, Thomas Edward	Phoenix
Foster, George S., Jr.	Tucson
Harrison, Ralph Waldo	Ashland, Wis.
Holmes, Laura	Tucson
Leslie, Beppie Lee	Tucson
Millar, Leslie Creighton	Tucson
Murphey, Elizabeth Ella	Tucson
Purcell, Ivy Mae	Tucson
Ratliffe, George Thomas	Tucson
Rider, Jane Herbst	Tucson
Rodgers, Pauline	Canaille
Rose, Frank Winfred	Livingston
Soule, Madeleine	Tucson
Steele, Willard Penn	Marshfield, C.
Strong, Leon Henri	Tucson
White, Edwin Henry	Cochise

UNCLASSIFIED—COLLEGE.

Bogan, Mrs. P., Philosophy, Spanish, Bookkeeping	Tucson
Brown, Clara Agnes, Spanish, Stenography	Tucson
Culley, Edith, Philosophy	Tucson
Douglas, Mrs. A. E., History, French	Tucson
Drachman, Myrtle, German	Tucson
Emery, Fannie, French	Tucson
Fewell, Mary A., French, Latin	Tucson
Forbes, Mrs. R. H., French, Spanish	Tucson
Hochderffer, George, Botany, History	Flagstaff
Hochderffer, Mrs. Mary J., Botany	Flagstaff
Hooper, Ethel, Physics, Spanish	Berkeley, Cal.
Kitts, Mrs. Katherine, French, Spanish, Philosophy	Tucson
Nutt, Anne, German	Tucson
Payne, Mrs. L. H., English, Spanish	Tucson

Pease, Ione, Spanish	Tucson
Ryder, Frank, Chemistry, Geology, Mineralogy	Tucson
Smith, Jerome H., Jr., Economics, Spanish	Lincoln, Neb
Wren, Ina Mae, Spanish, Music	Tucson

FOURTH PREPARATORY.

Angius, John	Bisbee
Batte, Benjamin Homer	Tucson
Beck, Charlotte Ellen	Tucson
Bennie, Florence Mary	Clifton
Brown, Rollin	Tucson
Button, Charles Aca	Williams
Coles, Henry Oliver	Bisbee
Culin, John Harding	Tucson
Dorr, Claudius Goldman	Batesville, Ark.
Duffy, Alice Elizabeth	Tucson
Duffy, Harriet Loretta	Tucson
Edgerton, Ambrose Earl	Silver Plume, Colorado
Emmons, Thomas Guy	Pearce
Estill, Howard Wilmot	Tucson
Firth, Charles Abraham	Aravaipa
Gillem, Alvan Cullam, Jr.	Fort Huachuca
Harwick, Claus Andrew	Buffalo, N. Y.
Mashbir, Sidney Freudenthal	San Antonio, Texas
McCloskey, Pearl Louise	Tucson
McDermott, Ora Martina	Tucson
McNeil, Clara May	Tucson
Nishihara, George Shikataro	Tucson
Pritchard, Stella M.	Tucson
Purcell, Marie Ella	Tucson
Maverick, Phillip Augustus	Tucson
Pusch, Henrietta Louise	Tucson
Rick, Leo Zeno	Tucson
Sine, Janet Volume	Tucson
Smith, Felicia Grace	Globe
Standeford, Charlton Greenleaf	Silverbell
Temm, Edward Byrne	Tucson
Trippel, Amy Irene	Tucson
Weeks, Robert Jackson	Greensburg, N. C.
Whitwell, Sturges Bigelow	Tucson
Wooddell, Florence Ella	Tucson

THIRD PREPARTORY.

Baker, Agnes Mary	Tucson
Barrows, Walter Almer, III	Sharpsville, Pa.
Bohannon, Mary Selene	Tucson
Brown, Kenneth Brooke	Tucson
Brown, James Lewis	Deming, N. M.
Cannon, Frank Mullen	Congress
Christie, Gerald Francis	Tucson
Clark, Benjamin Harrison	Benson
Cole, Carl Henry	Globe
Cole, Oscar	Tucson
Cook, Carrie Hampton	Tucson
Corda, Mamie Wilhelmina	Tucson
DeCorse, Benjamin Franklin	Yuma
Drew, Cecil L. L.	Mesa
Estabrook, Florence E.	Tucson
Goldbaum, Martha Anita	Tucson
Hawke, Viola	Tucson
Henry James Malcolm	Tucson
Henry, Lena Beatrice	Tucson
Horiuchi, Frank Shige	Yamashi, Japan
Huddleston, Julian	Tucson
Huddy, Viola Edith	Pearce
Jenkins, Alta Blanch	Los Angeles, Cal.
Jones, Sidney Raymond	Tucson
Jones, Mary Virginia	Tucson
Lovejoy, Arthur Luccoch	Tucson
McClure, John Englebright	Tucson
McVey, John Hopkins	Youngstown, O.
Morales, Teresa	Tucson
Morgan, Ethel	Willcox
Pusch, Wilhelmina	Tucson
Rodgers, Helen	Canaille
Roletti, Charles John	Tucson
Shaw, Harry Downing	Cananea, Mexico
Simonds, Marie Theres	Hermosillo, Mexico
Smith, Charlotte Ellen	Globe
Soto, Lucretia	Willcox
Udall, Dorothy	Cerro Colorado
Wooddell, De Leslie	Tucson
Wuerdeman, Walter Henry	Cincinnati, O.

SECOND PREPARATORY.

Allison, Josephine	Tucson
Anderson, Oney	Tucson
Baffert, Filomeno Santos	Tucson
Barker, Anna Ruth	Tucson
Barnes, Eva McGill	Morris City, Ill.
Bogan, John Stuart	Tucson
Brown, Beryl Roberta	Tucson
Cameron, Alice Faith	Tucson
Campbell, William Riggs	Tucson
Carrow, Melvin Paul	Kingman
Cheney, Bernice Lynn	Long, Beach, Cal.
Cook, Nina Reese	Tucson
Cramer, Benjamin Earnest	Flagstaff
Culin, Frank Lewis	Tucson
Dicus, Ruby Maud	Douglas
Dutton, Charles Allen	Flagstaff
Engle, Edgar Ernest	Bisbee
Glasscock, Bernard Charles	Pasadena, Cal.
Goldbaum, Beatrice Belle	Los Angeles, Cal.
Hofman, Gladys Buela	Tucson
Hubbs, Wayne	Kingman
Hughes, Mary Annetta	Tucson
Ingram, Julian Courtenay	Tucson
Johnson, Erving Almon	Morenci
Kavanaugh, Rose Agnes	Tucson
King, Thomas Richard	Tucson
Kuencer, Walter Emil	Kingman
Lando, Leona Sara	Tucson
Leake, Dora Adair	Tucson
Long, Olive Windaline	Globe
McComb, Richard Raymond	Willcox
McReynolds, William B.	Tucson
Nichols, Louise Wichman	Tucson
O'Connell, Mildred Luiza	Tucson
Pusch, Mabel	Tucson
Reese, D'Earl	Douglas
Rigg, Ralph Lee	Tucson
Rogers, Frederick William	Tucson
Rolfe, Clifton Howard	Tucson
Salazar, Jose Urbano	Chihuahua, Mex.
Skinner, Ida Belle	Tucson
Soto, Ernest Steve	Willcox

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UNIV. OF MICH.
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Volume 1, Number 6-7 May 1909

REGISTER

1908-09

ANNOUNCEMENTS

1909-10

PUBLISHED BY THE
UNIVERSITY OF ARIZONA
Tucson, Arizona

UNIVERSITY OF ARIZONA

REGISTER

1908–9

WITH ANNOUNCEMENTS FOR

1909–10

TUCSON, ARIZONA
F. E. A. KIMBALL, PRINTER
1909

CALENDAR.

1909.

Sept.	16,	Thursday	Entrance Examinations
Sept.	17,	Friday	Condition Examinations
Sept.	20,	Monday	Registration Day.
Sept.	21,	Tuesday	First Semester begins.
Nov.	24,	Wednesday	Thanksgiving Recess begins
Nov.	29,	Monday	Instruction resumed.
Dec.	23,	Thursday	Holiday Recess begins.

1910.

Jan.	3,	Monday	Instruction resumed.
Jan.	29,	Saturday	First Semester ends.
Jan.	31,	Monday	Second Semester begins
May	29,	Sunday	Baccalaureate Discourse.
May	31,	Monday	Exhibition Military Dept.
June	1,	Wednesday	Commencement.

BOARD OF REGENTS.

Ex-Officio.

HON. JOSEPH H. KIBBEY........................Phoenix
Governor of the Territory.

HON. KIRKE TONNER MOORE LL. B............Phoenix
Superintendent of Public Instruction.

Appointed by the Governor.

Term expires.

HON. MERRILL P. FREEMAN, Tucson.......August, 1909
Chancellor.

HON. GEORGE J. ROSKRUGE, Tucson.......August, 1909
Secretary.

HON. CHARLES H. BAYLESS, A. M., Tucson, August, 1909
Treasurer.

HON. A. V. GROSSETTA, Tucson..............August, 1911

Regular meetings on the 10th of each month.

OFFICERS OF INSTRUCTION, INVESTIGATION AND ADMINISTRATION.

FACULTY.

KENDRIC CHARLES BABCOCK, Ph. D.

B. L., 1889, Minnesota; A. M., 1895, Harvard; Ph. D., 1896, Harvard.

President; Professor of History and Economics. 1903 *

WILLIAM PHIPPS BLAKE. A. M.

Ph. B., 1852, Yale; A. M., Dartmouth; D. Sc., 1907, Pennsylvania; LL. D., 1908, Arizona.

Professor of Geology, Emeritus. 1895.

ROBERT HUMPHREY FORBES, M. S.

B. S., 1892, M. S., 1895, Illinois.

Director and Chemist, Agricultural Experiment Station. 1894.

†FRANK NELSON GUILD, M. S.

B. S., 1894, M. S., 1903, Vermont.

Professor of Chemistry and Mineralogy. 1897.

GEORGE EDSON PHILIP SMITH, C. E.

B. S., 1897, C. E., 1899, Vermont.

Irrigation Engineer, Agricultural Experiment Station. 1900

JOHN JAMES THORNBER, A. M.

B. S., South Dakota (Agricultural); B. S., 1897, A. M., 1901, Nebraska.

Professor of Biology; Botanist, Agricultural Experiment Station. 1901.

‡SAMUEL VICTOR McCLURE.

First Lieutenant, U. S. A., 1896, West Point.

Professor of Military Science and Tactics. 1904.

EDWIN MORTIMER BLAKE, Ph. D.

Engineer of Mines, 1890; Ph. D., 1893, Columbia.

Professor of Mathematics and Mechanical Engineering 1904.

---

*Dates following titles indicate appointment to service in the University.
†Leave of absence, 1908–9.
‡Resigned, November, 1908.

CYRUS FISHER TOLMAN, Jr., B. S.
B. S., 1896, Chicago.
Professor of Geology and Mining Engineering. 1905.

WILLIAM WHEELER HENLEY, A. B.
A. B., 1905, Leland Stanford, Jr.
Professor of Mechanic Arts. 1905.

ANDREW ELLICOTT DOUGLASS, Sc. D.
A. B., 1889; Sc. D., 1908, Trinity.
Professor of Physics and Astronomy. 1906.

ALBERT EARLE VINSON, Ph. D.
B. S., 1901, Ohio (State); Ph. D., 1905, Goettingen.
Biochemist, Agricultural Experiment Station. 1905.

CHARLES ALFRED TURRELL, A. M.
B. S., 1896, Nebraska; A. M., 1901, Missouri.
Professor of Modern Languages. 1904.

LESLIE ABRAM WATERBURY, C. E.
B. S., 1902, C. E., 1905, Illinois.
Professor of Civil Engineering. 1907.

ROBERT RHEA GOODRICH, M. S.
B. S., (Mining), 1885; B. S., (Mechanical Eng.), 1901; M. S., 1902, Massachusetts Institute of Technology.
Professor of Metallurgy. 1907.

ROBERT WAITMAN CLOTHIER, M. S.
B. S., 1897; M. S., 1899, Kansas (Agricultural).
Professor of Agriculture and Conductor of Farmers' Institutes. 1907.

J. ELIOT COIT, Ph. D.
B. S., North Carolina; M. S. 1905; Ph. D., 1907, Cornell.
Horticulturist, Agricultural Experiment Station. 1907.

ERNEST SUTHERLAND BATES, Ph. D.
A. B., 1902, A. M., 1903, Michigan; Ph. D., 1908, Columbia.
Professor of English. 1908.

HIRAM McL. POWELL.
Captain, U. S. A., 1890, West Point.
Professor of Military Science and Tactics, 1909.

WILLIAM BURNETT McCALLUM, Ph. D.
B. S. A., 1894, Toronto; Ph. D., 1904, Chicago.
Associate Botanist, Agricultural Experiment Station. 1907.

FREDERICK W. WILSON, B. S.
B. S., 1905, Kansas (Agricultural).
Associate Animal Husbandman, Agricultural Experiment Station. 1905.

WILLIAM GEORGE MEDCRAFT, A. M.
A. B., 1898, A. M., 1904, Kansas Wesleyan.
Assistant Professor of Mathematics. 1905.

RAYMOND C. BENNER, M. S.
B. S., 1902, Minnesota; M. S., 1905, Wisconsin.
Assistant Professor of Chemistry. 1906.

HENRY ALFRED ERNEST CHANDLER, B. S.
B. S., 1905, Northwestern.
Assistant Professor of History and Economics. 1908.

WILLIAM HORACE ROSS, Ph D
B. S., 1903; M. S. ,1904, Dalhousie; Ph. D., 1907, Chicago.
Assistant Chemist, Agricultural Experiment Station. 1907.

FRANK CALEB KELTON, B. S.
B. S., 1904, Arizona.
Assistant Engineer, Agricultural Experiment Station, 1909.

MARION CUMMINGS STANLEY, B. L

B. L., 1900, California.

Instructor in Philosophy. 1902.

ESTELLE LUTRELL, A. B.

A. B., 1896, Chicago.

Instructor in English; Librarian. 1904.

FREDERICK EDWIN TALMAGE, B. L.

B. L., 1903, California.

Instructor in Stenography and Bookkeeping. 1904

LEVONA PAYNE NEWSOM, Ph. D.

A. B., 1892, Ph. D., 1895, Franklin.

Instructor in Latin. 1905.

*OPAL IONE TILLMAN, B. S.

B. S., 1905; M. S. 1906, Ohio State.

Instructor in Domestic Science and Botany. 1906

IDA CHRISTINA REID, Ph. B.

Ph. B., 1906, Arizona.

Instructor in History and Mathematics. 1906.

CAROLINE BATES SINGLETON, A. B.

A. B., 1906, Wellesley.

Instructor in English. 1908.

ETHELBERT WEBB WALDRON, A. B.

A. B., 1905, Michigan.

Instructor in English. 1908.

WILLIAM ARTHUR TARR, B. S. (Mining).

B. S. (Mechanical Eng.), 1904, Oklahoma; B. S. (Mining), 1908, Arizona.

Instructor in Geology and Mining. 1908.

---

*Resigned March 9, 1909.

HELEN JANE ALDRICH, A. M.

A. B., 1904, Minnesota; A. M., 1905, Colorado.

Instructor in Modern Languages. 1908.

FRANK LEWIS KLEEBERGER, B. S.

B. S., 1908, California.

Instructor in Physical Training and Director of the Gymnasium. 1908.

ELIZABETH ELLINWOOD ROBERTS, A. B.

A. B., 1906, Western Reserve.

Instructor in German. 1908.

MABEL A. GUILD.

Instructor in Latin. 1908.

***MRS. W. J. KIRKPATRICK.**

Instructor in Music. 1909.

DANIEL TREMBLY MAC DOUGAL, Ph. D.

(Director of the Department of Botanical Research of the Carnegie Institution of Washington.)

Honorary Lecturer on Heredity and Evolution.

---

*Resigned April 1, 1909.

ADMINISTRATIVE OFFICERS AND ASSISTANTS.

FREDERICK EDWIN TALMAGE, B. L.
Secretary of the University; Head of North Hall. 1904.

HERBERT BROWN.
Curator of theTerritorial Museum.

LURENA MERRIMAN.
Preceptress of Young Women. 1907

ARTHUR W. OLCOTT, M. D.
Medical Examiner for Men. 1905.

FRANK LEWIS KLEEBERGER.
Head of South Hall. 1907.

WILBUR OLIVER HAYES.
Secretary of the Agricultural Experiment Station.

MILES M. CARPENTER, B. S.
Clerk in President's Office. 1907.

WALTER M. COLE.
Superintendent of Buildings and Grounds. 1907

MISS MABEL A. GUILD.
Assistant Librarian. 1908.

MISS B. S. CLAYPOOL.
Assistant in the Library. 1909.

LAWRENCE A. CALLOWAY.
Assistant in Chemistry. 1908.

FLETCHER M. DOAN.
Assistant in Metallurgy.

WILLIAM R. HARRIMAN.
Assistant in Physics.

ERNEST O. BLADES.
Assistant in Mechanic Arts.

STANDING COMMITTEES.

1908-1909.

The President is ex-officio member of all committees.

Executive.

Professors Forbes, Tolman, E. M. Blake.

Registration and Classification.

Professors E. M. Blake, Waterbury, Medcraft, Chandler

Library.

Professors Tolman, Turrell, Miss Lutrell.

Public Exercises.

Professor Medcraft, Miss Lutrell

Co-operative Association.

Mr. Talmage.

Rhodes Scholarship.

President Babcock, Professors Guild, Bates

UNIVERSITY OF ARIZONA

Established by Act of the Legislative Assembly, 1885; Open to Students, October, 1891.

PURPOSE AND ORGANIZATION.

The University of Arizona is an integral part of the system of public education established by and for the Territory, and aims, as the head of such system, to fill the same position as that occupied by the State Universities in such states as California and Wisconsin. Its general organization is in accordance with the Act of Congress of July 2, 1862, known as the Morrill Act, creating the "Land Grant Colleges." The details of its organization and government are regulated by the Act of the Legislative Assembly of the Territory of Arizona, passed in 1885 and embodied, with amendments in the Revised Statutes of Arizona Territory, 1901, which vests the government of the institution in a corporation styled the Board of Regents of the University of Arizona, consisting of the Governor and Superintendent of Public Instruction of the Territory, ex-officio, and four other members appointed by the Governor for a term of four years.

In creating the University, the Legislative Assembly wisely followed the example of the great states of Wisconsin, Illinois, Minnesota, Nebraska, and California, in unifying under one management the various schools and institutions of higher learning or investigation in Arizona,—the colleges of liberal arts, the schools of mining and engineering, the agricultural college, and the agricultural experiment station, which in some States have been widely and completely separated. No professional schools of law, medicine, dentistry, or music have been established. In compliance with the provisions of the Act creating it, the University consists of

I. The College of Agriculture and Mechanical Arts.
II. The School of Mines.
III. The Agricultural Experiment Station.
IV. The Preparatory Department.

The Normal Department, authorized by the statute, has not yet been organized. The Preparatory Department, which is really a first class manual training high school with a four years course, will gradually disappear as the educational system of the Territory is developed by the establishment of efficient high schools, but no date is set for abolishing even the first year of this preparatory course.

The University in all departments is open to properly qualified persons of both sexes. Through the aid received from the United States and from the Territory, it is enabled to offer its privileges to residents and nonresidents, with only very moderate charges. The number of students in any one class or section of a class is kept below twenty, in order that each student may receive the individual attention of the instructors and thus gain the full advantage derivable from a small school.

The purpose of the University of Arizona is, in the language of the organic law, "to provide the inhabitants of this Territory with the means of acquiring a thorough knowledge of the various branches of literature, science and the arts," and so far as possible a technical education adapted to the development of the peculiar resources of Arizona. In furtherance of this latter purpose, instruction is provided especially in subjects fundamental to agriculture, the mechanic arts, mining and metallurgy. The University, by the nature of its situation, frankly lays its strongest emphasis upon the course in mining engineering. It is, in reality, a great mining laboratory, surrounded as it is on all sides by great mines. Some of these mines developed on a large scale are within a few miles of the city and the number and magnitude of such enterprises are steadily increasing. Probably no University in the United States offers such fine advantages to the students of mining engineering who desire to see the actual operation of great mines, or the development of great enterprises, while carrying on the theoretical and experimental work of the mining course.

The advantages in civil engineering are hardly less noteworthy, for Tucson is not only a division point on the main line of the Southern Pacific railroad, with large shops, roundhouses, and engineering offices, but it has the administrative and engineering headquarters for five of the subsidiary or allied lines of the Southern Pacific system in Arizona and in Sonora, Mexico, commonly known as the Randolph lines, including the great West Coast Line which will reach from Guaymas to Mazatlan and Guadalajara, in Mexico. All of these lines are undergoing extensive expansion and rebuilding, and so furnish excellent opportunities for observation and vacation employment for students of civil engineering.

LOCATION AND CLIMATE

The University of Arizona is located at Tucson, a city of eighteen thousand inhabitants, on the main line of the Southern Pacific railway, 312 miles west of El Paso, Texas, and 500 miles east of Los Angeles, Cal. The city lies in a broad flat valley at an elevation of 2,400 feet above sea level and is surrounded by mountains. Its dry, mild, and equable climate has made Tucson a famous winter resort unsurpassed for healthfulness.

The winter climate is especially good; the temperature is cool and strengthening but not severe, the lowest temperature recorded during the average year being about twenty degrees above zero, Fahrenheit. Little rain falls during the winter; fogs are all but unknown; cloudy days are rare. The percentage of sunshine throughout the winter is greater than that recorded at any other place in the United States. Owing to the extreme dryness of the air the highest temperatures known are less oppressive to the senses and less dangerous to the health than the summer heats of the upper Mississippi Valley States. The total amount of rainfall averages less than twelve inches

These advantages insure to students a comfortable education and a wide range of out-door sports and recreations throughout the college year.

The University Campus, consisting of fifty-five acres, is situated upon high ground about a mile from the business center of the city with which it is connected by an excellent electric street-car line. On every side it commands a view of mountain scenery of remarkable extent and grandeur. The buildings are lighted by electricity furnished by the city plant.

An abundant supply of unusually good water for household, laboratory and irrigation purposes is drawn from a large well on the Campus from a depth of one hundred and twenty feet, thus securing immunity from the dangers of a contaminated water supply. The Campus has a complete sewer system connecting all the buildings, with one exception, with the city mains at the University gate.

The Campus, carefully laid out in drives, lawns and gardens, with a large number of palms, olive, ash, umbrella, pepper, bagota and cottonwood trees has the air of a well kept park.

BUILDINGS.

The main building, University Hall, the oldest of the group, is 200 x 150 feet, two stories in height, the first of gray stone, the second of red brick. It is completely surrounded by a wide two-story veranda. The building contains recitation rooms, laboratories and apparatus rooms of various departments, an assembly room, and the office, laboratories and library of the Agricultural Experiment Station.

The library and museum building is a handsome structure of red brick and Bedford sandstone, with a massive tile roof. The interior finish is in natural oak and pine. The library reading room, on the second floor, is a large, well-lighted room, beautifully furnished with heavy solid oak reading ables, desks and wall cases. The stack room at the rear is fitted up with the most modern steel stacks. The Museum occupies part of the first floor and the west half of the second floor. Fine oak and plate glass cases constitute the furnishings. The offices of the president and secretary of the University, three lecture rooms for the departments of geology, mathematics, English and history, work rooms for the library and museum, and a laboratory for the department of geology are on the first floor.

Science Hall, a new building, of architecture harmonious with the Library, which it faces, was completed in April of this year, within the appropriation of $40,000 made by the Territorial Legislature of 1907. Another appropriation of $12,000 was made in March for furnishing and equipping the building, which will thus be ready for occupancy in September. The building, 145 x 60 feet, is of three stories, the first to be devoted to physics, the second to chemistry and mineralogy, and the third to botany and biology. The roomy attic and a superstructure on the roof are used as an astronomical observatory. The forty rooms provided by this Science Hall will give excellent accommodations in place of the crowded quarters endured by several departments in recent years in University Hall, and the removal of these departments to the new building will give the Agricultural Experiment Station much needed space for its expanding work.

North Hall, a dormitory two stories in height, built of gray stone of fine quality, is occupied by the college men. Besides the parlor, and rooms of the instructor in charge, it contains seventeen rooms, each large enough to accommodate two students, besides bath and toilet rooms.

South Hall, a large brick building containing forty rooms, besides bath and toilet rooms and store rooms, is the dormitory mainly for preparatory students. It is heated by a hot-water system. It will accommodate seventy-five students.

West Cottage, with its new four-room annex, is the dormitory for young women,—a two story brick house with wide porches, surrounded with vines, shrubbery, lawns and trees.

The Dining Hall, built of red brick, provides ample boarding accommodations for all persons living on the Campus.

The Shop and Assay Building is a large, substantial brick structure. It contains a commodious drawing room for mechanical and free-hand drawing, a large laboratory for forge work, machine practice and carpentry, and a lecture room, instrument room, and material-testing laboratory for the department of civil engineering. Two other rooms are used for lockers, and for the motor and engine. The assay laboratory and commercial assaying department occupy five rooms fully equipped with a large melting furnace, the necessary muffle furnaces, and other accessories for making complete and accurate assays.

The Mill or Mining Machinery building, located to the northeast of the main group of buildings, is a plain wooden structure in which are placed the stamp-mills, jigs, concentrating tables, separators, etc., necessary for the mining laboratory.

Herring Hall, the gymnasium, is a very substantial high building, 40 x 80 feet, constructed of red brick and white plaster. It was erected in 1903, the gift of Professor James Douglas and his associates of the Copper Queen Consolidated Mining Company, through Colonel William Herring, after whom it was named, at the suggestion of Professor Douglas.

The pump house and mechanical engineering laboratory was built in 1905. By the use of brick, cement and iron it is practically fire proof, thus insuring safety to the well and pumps supplying the University with water for all its uses .

Two two-story brick residences are occupied by the President of the University and by the Director of the Agricultural Experiment Station.

Other buildings are the cottage occupied by the Superintendent of Buildings and Grounds, three greenhouses, a brick barn, and various smaller out-buildings used for shops and store rooms.

MAINTENANCE.

The University is maintained by funds appropriated by the United States and by the Territory of Arizona. Fifty-seven sections of very valuable pine land in Coconino County have been set apart by the Federal Government for the benefit of the University, but title and control of the land does not pass to the Board of Regents until the Territory is admitted as a State. In the meantime only a very small sum is annually received from the leases of this land.

By the provisions of the Morrill Act of 1890, the University receives annually from the United States the sum of $25,000 "to be applied only to instruction in agriculture, the mechanic arts, the English language and the various branches of mathematical, physical, natural and economic science, with special reference to their applications in the industries of life, and to the facilities for such instruction." This Morrill Fund is to be ultimately duplicated by the Nelson Fund, created by the Act of March 4, 1907, which appropriated $5,000 for the year beginning July 1, 1907, and provided for an annual increase of $5,000 until the total received by each State should be $50,000 per year from the two funds, The University receives from the same source, for the support of the Agricultural Experiment Station, $15,000 yearly from the Hatch Act of 1887; the Adams Act of 1906, for the current year, appropriates $11,000 which is to be increased annually by $2,000 until it also produces $15,000, giving the Station ultimately $30,000 per year.

The appropriations by the Territorial Legislative Assembly of 1909 were $35,500 per year, for two years, for maintenance; $13,100 for the work of the Agricultural Experiment Station, and $23,000 for improvements.

For the year 1909 the El Paso & Southwestern system has given the University $2,000 for the work of the Agricultural Experiment Station in carrying on experiments in dry-farming in Cochise County.

The University also receives annually, from miscellaneous sources such as matriculation and tuition fees, rent of cottages, damage to University property, etc., about $1,500. The receipts for board, lights, etc., amount to about $16,000 per year.

ENDOWMENT.

By the munificence of Doctor James Douglas, of New York, the University received in June, 1908, "the sum of $10,000 * * * the annual interest or income from which is to be annually applied, devoted, expended and used by said Board of Regents, or its successors in trust, for the purchase of instruments of precision and research, or special apparatus, for scientific instruction and education in the department of mineralogy and School of Mines of the University of Arizona, * * * but no part of said fund or income is to be used or applied to the purchase of mining or metallurgical machinery or supplies for said department or for the use of the students in the chemical or metallurgical laboratories." The fund thus created has been named by the Board the Douglas Endowment Fund.

The Philo Sherman Bennett Scholarship is endowed by the gift of $500 to the University in 1905, through the agency of Mrs. William Jennings Bryan, the income to be used in aiding young women to secure an education.

EQUIPMENT.

LIBRARY.

The library contains 14,000 bound volumes and 12,000 pamphlets, and is open for the use of all students. Of these volumes a collection of complete sets of scientific and literary periodicals, to which additions are made yearly, is of special service in reference work. The library was made a regular depository of United States Government documents in 1907.

The books are classed by the decimal system and shelved in numerical order with a further author division according to the Cutter numbers. The catalogue is the usual dictionary card catalogue of authors, subjects and titles in one alphabetical arrangement. Library of Congress cards are used whenever obtainable. The Reading Room is supplied with about 600 books of general reference which may be consulted by the students without any formality. The following current periodicals and newspapers are on file for the use of students and general readers in the Reading Room:

PERIODICAL LIST.

*Advocate of Peace,
American Architect and Building News,
American Blacksmith,
American Chemical Journal,
American Chemical Society, Journal,
*American Economist,
American Historical Review,
American Institute of Mining Engineers, Transactions,
American Journal of Pharmacy,
American Journal of Science,
American Journal of Sociology,
American Machinist,
American Magazine,

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*Donated.

American Mathematical Society, Bulletin,
American Mathematical Society, Transactions,
American Naturalist,
*American Philosophical Society, Proceedings,
American Society for Testing Materials, Proceedings,
American Society of Civil Engineers, Transactions,
Arena,
Annales des Mines,
*Arizona Mining Review,
Association of Engineering Societies, Journal,
Astrophysical Journal,
Athenaeum,
Atlantic Monthly,
Australian Mining Standard,
Biedermann's Zentralblatt fur Agrikulturchemie,
*Bookbuyer,
Bookman,
Botanical Gazette,
Botanisches Centralblatt,
*California Cultivator,
Canadian Entomologist,
Canadian Mining Journal,
*Canal Record,
Cassier's Magazine,
Cement,
Century,
Chemical, Metallurgical and Mining Society of South Africa, Journal,
Chemical News,
Chemical Society, Journal, (London),
Chemisches Centralblatt,
Coal and Coke,
Collier's Weekly,
Conservation,
Craftsman,
Cumulative Book Index,
Current Literature,
Delineator,
Deutsche Chemische Gesellschaft, Berichte,
Dial,
Economic Geology.
*Educational Gazette,
Educational Review,
Electrical Review,
Electrical World,
Electrochemical and Metallurgical Industry,
Engineering and Mining Journal,
Engineering Index,
Engineering Magazine,
Engineering News,
Engineering Record,
Espana Moderna, La.,
*Farmer's Voice,
Fern Bulletin,
Forum,
Franklin Institute, Journal,
Geological Magazine,
Geological Society of America, Bulletin,
Geologisches Centralblatt,

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*Donated.

Good Housekeeping,
Graphic (London),
Harper's Monthly Magazine,
Harper's Weekly,
Havana University, Revista de la Facultad de letras y ciencias.
Institut de France, Paris, Academie des Sciences, Comptes rendus des Seances.
International Studio,
Irrigation Age,
Journal of American Folk-lore,
Journal of Geography,
Journal of Geology,
Journal of Political Economy,
Ladies' Home Journal,
Literarisches Zentralblatt,
Literary Digest,
Living Age,
*Lowell Observatory, Bulletin,
McClure's Magazine,
Manual Training Magazine,
Mexican Mining Journal,
Mineral Industry,
Mines and Minerals,
Mining and Scientific Press,
*Mining Reporter,
*Mining Review,
Mining Science,
*Mining World,
Modern Language Association of America, Publications,
Nation,
New Zealand Mines Record,
Nineteenth Century and After,
North American Review,
*Our Dumb Animals,
Out West,
Outing,
Outlook,
Plant World,
Poet-lore,
Political Science Quarterly,
Popular Astronomy,
Popular Science Monthly,
Power,
Practical Engineer,
*Prairie Farmer,
Public Libraries,
Publishers' Weekly,
Quarterly Journal of Economics,
Queensland Government Mining Journal,
Reader's Guide to Periodical Literature,
Review of Reviews,
Revue des deux Mondes,
School Review,
School of Mines Quarterly,
Science,
Scientific American,
Scientific American, Supplement.
Scribner's Magazine,
Societe Francaise de Mineralogie, Bulletin,
Society of Chemical Industry, Journal,
South African Mining Journal,
World's Work.

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* Donated.

Torrey Botanical Club, Bulletin,
Zeitschrift fur Anorganische Chemie,
Zeitschrift fur Physikalische Chemie.

NEWSPAPERS ON FILE IN THE READING ROOM.

*Arizona Blade,
*Arizona Bulletin,
Arizona Daily Star,
*Arizona Gazette,
Arizona Range News,
*Arizona Silver Belt,
Arizona Weekly Journal Miner,
Bisbee Review,
Coconino Sun,
Los Angeles Times,
*Graham County Guardian,
Mojave County Miner,
New York Evening Post (Saturday).
*Oasis,
Prescott Weekly Courier,
Southwestern Stockman,
*Tempe News,
Tucson Citizen,
Tucson Post,
Tombstone Epitaph,
Weekly Republican.

The Carnegie Library of the City of Tucson is also open to the use of the students of the University. This library is also a depository of United States Government documents.

MUSEUM.

The Seventeenth Legislative Assembly of Arizona established a general museum at the University, to promote the collection of materials of all kinds illustrating the resources and development of Arizona, and particularly to preserve historical relics, including those pertaining to the aboriginal inhabitants. Donations of specimens and collections will be received and acknowledged with thanks, but no special provision has yet been made by the legislature for the support of this department, aside from a small appropriation for the salary of a curator.

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*Donated.

The professors of the University have the immediate care of the collections pertaining to their respective departments. The collections now displayed at the University comprize representative series of minerals, ores and rocks of Arizona. Among these may be particularly mentioned superb specimens from the mines of the Copper Queen Mining Company at Bisbee. There are also collections of typical rocks and minerals for comparison, and many specimens of ores from different parts of the United States and from abroad. It is desired to make the collection of ores and minerals fully represent the great mineral resources of Arizona.

The Museum is indebted to Mr. Herbert Brown, curator, for a large and valuable collection of skins of the birds of Arizona, which he has deposited in the Museum, as well as for a collection of ancient aboriginal pottery and other relics. The fossil skull and teeth of an elephant, and other fragmentary remains of extinct animals, sent from Yuma by Mr. Brown, deserve special mention.

Historical records of much value are gradually accumulating as a part of this museum, and an appeal is made to old settlers and others to bear this fact in mind when making disposition of articles bearing even remote relation to the early pioneers and their history. All records and data of any nature that can be gleaned are worthy of preservation, and it is earnestly desired to have. them placed at the University, where they will always be accessible for reference.

AGRICULTURE AND HORTICULTURE.

For purposes of instruction and demonstration by the department of agriculture, as distinguished from the Agricultural Experiment Station, the University has purchased a tract of eighty acres of rich alluvial land in the Rillito valley just north of the Campus, which will take the place of the twenty-three acres leased during the past year in the Santa Cruz valley. On this tract new construction will be undertaken during the coming summer with a view to a rapid and permanent development of a varied instructional plant to meet the needs peculiar to this part of the great Southwest. In addition to the regular laboratories in physics, chemistry, etc., a special laboratory for soil physics will be fitted up in University Hall for use in the coming year. An excellent seed collection, green houses and tracts for experimentation, and a well selected agricultural library are other valuable parts of the equipment of the department. Funds have already been set aside for the purchase of live stock for the work in animal husbandry.

In addition to regular courses of instruction in agriculture and horticulture, "Timely Hints for Farmers," issued under the auspices of the Experiment Station, are of distinct educational value. Three thousand farmers of the Territory are reached more or less regularly by timely publications on subjects of vital interest. Farmers' Institutes, announcements of which are made from time to time, are supplemented by short courses in agriculture.

Small and well selected agricultural libraries of small cost have been forwarded to a considerable number who have expressed a willingness to receive them.

BIOLOGY.

The biological laboratories are at peresent located on the second floor of University Hall. They are soon to be moved into Science Hall, to a fine suite of rooms, convenient and well-lighted; the equipment is such as is required for modern instruction and research in the biological sciences. The library and apparatus are well selected and adapted to the region and the courses offered.

The collections possessed by the department form a very important part of its equipment. The herbarium consists of 12,000 sheets of mounted plants, of which number 2,500 are included in the University botanical survey herbarium. The unique flora and fauna of the mountain, mesa and lowland collecting grounds, in close proximity to the institution, offer very attractive opportunities for instruction and research especially along ecological lines. The Desert Botanical Laboratory of the Carnegie Institution supplements in most admirable fashion the facilities of the University for investigation.

In addition to the above there are fifty cases of insects, a large case of seeds, articulate and disarticulate human skeletons, plaster and papier mache models of the important structures of the human anatomy, and duplicate material for study and dissection.

CHEMISTRY.

The chemical laboratories used for instruction have for many years been located in University Hall, but at the beginning of the next academic year they will occupy the extensive suite of twelve laboratories, class rooms, storerooms, etc. on the second and third floors of the new Science Hall.

That used by beginners in the study of general chemistry and qualitative analysis is on the second floor of University Hall, and is equipped for the experimental and theoretical study of chemical science.

The laboratory for qualitative analysis is on the first floor of University Hall. It is thoroughly equipped for the teaching of volumetric and gasometric analysis, blow-pipe analysis, metallurgical chemistry, and wet and fire assaying, including apparatus for the electrolytic determination of metals.

The balance room contains analytical and bullion balances of the latest model so arranged as to insure a maximum of stability and accuracy. A lecture and demonstration room fitted with sinks, cabinets, etc., completes an equipment of apparatus and collections adequate for first class instruction in both theoretical and practical chemistry.

The laboratories of the Agricultural Experiment Station occupy three rooms on the first floor. These are devoted to analytical work and chemical investigations relating to agriculture. Though not intended for the use of students they are of incidental value to the instructors and students through the investigations which are here conducted.

CIVIL ENGINEERING.

The apparatus in this department has been chosen with the view of familiarizing the student with the instruments which are used in practical civil engineering work and in the allied branches of hydraulic and mining engineering. The equipment includes surveyors' and engineers' levels; plane table; stadia, level, and transit rods; aneroid barometers; odometer; automatic water registers; hook gauges; current meters; drafting instruments; mechanical calculators; planimeter; a complete set of apparatus for testing cement; and an Olsen Universal testing machine of 100,000 pounds capacity.

GYMNASIUM.

Herring Hall, the gymnasium, is fully equipped for the purposes of the department of physical training and athletics. The apparatus is of standard make, and includes forty chestweights, dumb-bells, bar-bells, wands, Indian clubs, Medart vaulting horse, parallel bars, horizontal bar, quarter-circle, abdominal chair, wrestling machine, finger machine, chest expander, chest developer, climbing rope, flying rings, traveling rings, striking bag and drum, jump and vaulting stands, fencing foils and masks, basket balls and goals, five large mats and a set of anthropometric apparatus.

In the basement are located ninety-six lockers, and five shower baths which are supplied with hot water from a heater with large reservoir.

The outdoor equipment consists of two baseball fields; a football field, six-lap track, and straightaway, at the rear of the gymnasium; four fine tennis courts; and a basketball court for girls.

MATHEMATICS.

Models are an important aid to the study of mathematics. The collection of the department includes thread models of about forty ruled surfaces of the third, fourth nd sixth orders. These illustrate the theory of surfaces and are also valuable in the study of kinematics and linkages.

The Bulletin and Transactions of the American Mathematical Society, and the Encyklopedia der Mathematischen Wissenschaften are subscribed for by the University Library.

MECHANIC ARTS.

The Shops and Drawing rooms occupy a total floor area of about 8,000 square feet, divided into a large shop, and machinery room, with adjacent tool rooms, supply rooms and store rooms, a draughting room, model room, pattern room, lecture room, and offices.

The entire building is well ventilated and lighted, from above as well as from the sides. The drafting room is heated by steam.

The wood shop is equipped with a full assortment of hand tools, six turning lathes, a Universal woodworking machine, a Whitney dimension sawing machine, a band saw, a Universal trimmer and a large grindstone with truing device.

The forge room contains twenty-four down-draught forges, twenty-four anvils, a combination shear and punch, a blacksmith's drill press and a full assortment of small tools and appliances. Blast is furnished by a No. 3 Sturtevant blower; the smoke and gases are removed by a 70-inch exhaust fan.

The machine shop contains one 24-inch Lodge and Shipley engine lathe with taper attachment, two 14-inch Lodge and Shipley lathes, one 14-inch Pratt and Whitney lathe with taper attachment, one 10-inch Reed speed lathe, one 16-inch Cincinnati shaper, one 24-inch by 6-foot Woodward and Powel planer, one Brown and Sharpe No. 2 Universal milling machine, one Brown and Sharpe No. 1 Universal grinder, one 24-inch Prentice Bros. drill press, one power hack saw, one drill grinder, one emery stand and one grinding attachment for the lathes. A 1 1-2 ton portable crane and a 1-ton triplex chain hoist are used in handling the heavier work.

Each shop has its own tool room well arranged and supplied with small tools, gauges, measuring instruments, etc.

A large wash room containing a hundred lockers, is supplied with basins and running water.

MECHANICAL ENGINEERING.

This department has a drafting and recitation room in the Library Building in addition to the regular drawing rooms of the department of Mechanic Arts. In this room is the catalogue file containing the trade literature of about five hundred leading manufacturers of the United States; the collection of working drawings consisting of over three hundred blue prints, and the sample collection of models, machine parts, valves, electrical fittings, insulating materials, abrasives, etc.

The mechanical and electrical laboratory, which occupies a large room adjoining the Pump House, is equipped for the study and operation of boilers, steam and gasoline engines, hydraulic and electrical machinery. Besides the machinery of the shop and mill which can be used for experimental purposes and for study of machine design, the University has a 45 h. p. tubular boiler, 35 h. p. Atlas engine, 30 h. p. Scott engine, a 10x7x10 Worthington Duplex pump, a Duplex feed pump, a Cameron pump, a 3 h. p. and a 1-2 h. p. direct current electric motor, an injector, a 500-gallon fire pump, a 40 h. p. Fairbanks-Morse gasoline engine, a 23 k. w. direct current Crocker-Wheeler generator, electrical measuring instruments, and a steam guage tester. A 300-gallon two-stage centrifugal pump in the University well and its electric motor serve as part of the equipment for mechanical engineering.

METALLURGY.

The Mill, or metallurgical laboratory, is equipped for use by the students of metallurgy in connection with their work in testing ores as to their adaptability for treatment by different processes both on a large and a small scale.

The chief features of the equipment are: a Blake crusher, 4 in. by 7 in.; a Dodge crusher, 4 in. by 6 in.; sampling rolls, 6 in. by 9 in.; a cone and burr sample grinder; a pebble mill with a capacity of about 15 lbs. at one charge; a laboratory lightning crusher and a disc pulverizer; a 5-stamp mill, with 800-pound stamps; a 3-stamp mill, with 250-pound stamps; inside and outside amalgamated plates for the same; a 2-ft. clean-up pan; a 1-ft. amalgamation pan, and a 9-jar revolving agitator for testing samples of a few ounces; a No. 5 Wilfley table of the latest pattern, and a Hallett hand jig; a 1 1-2 ton cyanide plant for treating sands or dry crushed ore; two 150-lb. cyanide plants for treating smaller samples; 3-ft. agitator; a 12-in., 6-chamber, flush plate and frame, washing filter press and pump for the same; a Sturtevant shaking screen; a Tullock ore feeder, a belt and bucket elevator, sampling plates, split samplers, a shaking screen, percolators, sizing screens from 1-mesh to 200-mesh, miner's pans, bateas, retorts, etc.

The power for operating this plant is furnished by a 30 h. p. Westinghouse induction motor, type C.

The assay laboratory is equipped with assay furnaces for crucible work, for scorifying and cupeling, and for retorting mercury from amalgam, besides all needed appliances for assaying by dry and wet method including electrolysis. The laboratory also has desks and fittings for the chemical work required in the metallurgical and mineralogical investigation and analysis of ores, in mineral fertilizers, and in qualitative tests of minerals.

MILITARY.

Room O, in University Hall, is used as an armory. It is fitted up with the necessary gun racks and accessories. The equipment includes 150 old style Springfield rifles, 100 Krag cadet rifles with complete accoutrements, eight sabers and belts, musical instruments for the band, and signal flags. A large clear area south of the Library building is kept leveled and smooth for a drill ground and parade ground. At the rear of the Mill building are the targets for short range practice.

Fifteen 10 x 12 army wall tents with poles, etc., and a mess outfit, constitute the camp equipment of the department of military science and tactics for use on practice marches and annual encampments.

MINERALOGY AND PETROGRAPHY.

The laboratory for qualitative analysis is used for determinative mineralogy and blow-pipe analysis. The laboratory is supplied with necessary apparatus for student work, including glass and wooden models for the study of crystallography, hand and reflecting goniometers for the measurement of the angles of crystals, a polariscope for the study of the optical properties of minerals, and a type set of 600 minerals.

For the study of petrography the laboratory is supplied with a type set of rocks classified according to Rosenbusch's *Elemente der Gesteinlehre* with thin sections corresponding, four petrographic microscopes, a collection of oriented sections of minerals and apparatus for studying interference phenomena.

In anticipation of occupying the fine quarters in the new Science Hall, Prof. Guild, who is absent on leave in Europe during this year, has been authorized to spend $1,000 for further equipment for the department of mineralogy.

PHYSICS AND ASTRONOMY.

The department of physics and astronomy, hitherto located in University Hall, will occupy in September, 1909, the entire first floor of the new Science Hall, where the facilities for the demonstration of all important phenomena will be very complete. A lecture room seating forty persons will be fitted with every modern convenience, such as lights, water, gas, heliostat, alternating and direct currents of great range, an opaque projection lantern, a double dissolving arc-light Ideal stereopticon, elevated seats, shutters for darkening the room, etc. Two large main laboratory rooms supply space for mechanical and electrical work, while separate special rooms are devoted to heat, sound, light, magnetism and research work. A carpenter's shop, a repair and store room, a photographic dark and enlarging room and a constant temperature room are provided. A pendulum seismograph will be installed in the magnetic laboratory and a special space has been provided for a 55-foot Foucault pendulum and the study of falling bodies.

An eight-inch Willyoung induction coil with storage and X-ray accessories is used in the study of high-tension electricity. Through the generosity of the Honorable Mark J. Egan, of Clifton, the University added to its equipment for the study of electricity a fine imported set of miniature wireless telegraphy apparatus, capable of transmitting messages about two hundred feet. The department is also equipped with three motor generator sets, the largest having an output of 7 kilowatts, with a Leeds and Northrup potentiometer and accessories, and with very complete appartus for showing electro-magnetic phenomena, rotary fields, stationary electric waves, etc.

The astronomical observatory is at the top of the building where a sliding roof, 12 feet square, uncovers the telescope and discloses a clear horizon in every direction. An 8-inch Clark lens and mounting, both of the first quality, loaned to the University by the Observatory of Harvard University,Cambridge,Mass.,are mounted on a cement pier supported on the main walls of the building, and give perfectly steady images. This lens is most efficient in fundamental research work.

The equipment also includes a four and one-quarter inch Brashear telescope, siderial and mean time clocks and pier for latitude and longitude observation.

GENERAL INFORMATION.

COLLEGE OF AGRICULTURE AND MECHANIC ARTS.

The courses offered in the College of Agriculture and the Mechanic Arts provide both a liberal training along literary and scientific lines and technical training along engineering, mechanical and agricultural lines. Great latitude of election is given in the literary and scientific courses, but the courses in engineering are more rigid in their requirements. Full details of the various courses follow. The aim in all is to combine the practical with the theoretical instruction. The needs of a young and growing commonwealth are kept in mind, and a steady attempt is made to develop the adaptability and resourcefulness so necessary to meet changing conditions.

ARIZONA SCHOOL OF MINES.

The School of Mines is designed for the education and training of young men in the arts and sciences directly involved in the industries of mining and metallurgy. Especial attention is given to the sciences of mathematics, physics, chemistry, mineralogy, geology and their applications. The Bureau of Mines and Assaying, while not directly connected with the work of instruction, affords with its laboratory and the influx of new material, a valuable object lesson to the advanced students of mining and metallurgy.

REGISTRATION.

All students are expected to register on registration day at the beginning of the year and at the beginning of the second semester, in the University office or in such rooms as may be designated on that day. Before making choice of elective subjects the student should in every case confer with the instructors concerned and with the committee on registration. A matriculation fee of $5.00 is required of all students upon entering the University. No student will be considered registered until the matriculation fee has been paid. This fee is paid once and is not required for future registration. After registration no change in classes can be made without the consent of the committee on registration.

Students entering from other institutions should present to the committee certified copies of their records in such schools, together with certificates of graduation or of honorable dismissal. A copy of the school catalogue or course of study should be furnished with the credentials, in order to facilitate the work of the committee.

TUITION.

Tuition is free to students of Arizona. For all non-resident students, tuition is $10 for each semester. No reduction will be made for late registration or early withdrawal.

RECORDS.

The class standing of each student is determined by the instructor in charge. The method of ascertaining the student's record is left to the instructor, and his report in all cases is final.

DISCIPLINE.

The disciplinary policy of the University in all its departments is based upon the assumption that the students are young gentlemen and young ladies who come to the institution with a high determination to utlize fully the opportunities offered, and with a keen sense of duty, honor and curtesy to each other and to the faculty. Formal and explicit prohibitions and rules are few, but those will be rigidly enforced, with adequate penalties, and good order and discipline will be maintained. The University is a civil rather than a military community, and such privileges as will not be abused will be allowed all classes of students. In aggravated cases, such as cheating in University work, frequenting saloons and other objectionable places, and serious breaches of peace or order, the faculty will not hesitate to proceed to the extreme measure of expulsion. In case of expulsion the student is required by regulation of the regents and faculty to leave the campus immediatly, and by Territorial statute to surrender his cadet uniform to the University. In all matters of discipline the faculty and President will strive for fairness, equity and efficacy rather than uniformity.

Students or classes desiring to make requests of the faculty should file their petition in the President's office before the hour of faculty meeting; class petitions must be presented at least two days before the time of meeting.

VACATIONS AND HOLIDAYS

A short recess (see Calendar, page 2) is taken at Christmas time. The long summer vacation begins about June first and continues until the middle of September. The Thanksgiving recess extends from the close of the regular exercise on the Wednesday before Thanksgiving to the next Monday morning. During the spring, the cadet companies make a pratice march of from three to seven days, which constitutes in reality a third vacation for the preparatory department and for freshmen. All legal holidays are observed by the cessation of ordinary University work.

Arbor day has been formally adopted by the University regents as the regular anniversary on which to celebrate the founding of the institution, in connection with the ceremonies of tree planting.

LIVING ACCOMODATIONS.

Provision is made so far as possible for furnishing board and rooms to students of both sexes upon the University grounds. Young men have comfortable quarters in South Hall, which can accommodate about seventy-five students, two in a room, and in North Hall (for College men only), which can accommodate thirty-five students. West Cottage, the home of the young ladies, is in charge of an experienced and capable preceptress who has constant supervision of those rooming there. *No students known to have tuberculosis will be admitted to the dormitories or dining hall.*

All dormitories are lighted by electricity; South Hall is heated by a hot water system, the other dormitories being heated by stoves. Rooms contain a clothes press, and are provided with single bedsteads, table, chairs, mirror, wash-bowl, pitcher and slop-jar. Students will supply their own mattresses, pillows, sheets, blankets, towels, rugs and brooms, and such other articles as they may desire for ornamenting their rooms. They will care for their own rooms under the direction of the head of each dormitory.

The Dining Hall of the University has accommodations for one hunderd students. It is under the management of a paid steward who is responsible to the president and the Board of Regents. While the charge for board is very low, it is the aim of the management to serve substantial, wholesome, appetizing meals. All students having rooms in the dormitories are required to take their meals at the Dining Hall. Students and members of the faculty who reside outside the dormitories, may board at the Dining Hall.

By resolution of the Board of Regents of the University, board is to be paid in advance on the twelfth of each month. If tickets for the Dining Hall are not purchased before the twelfth of each month, $18.00 instead of $17.00 will be charged for the month's board. Checks and postoffice or express money orders should be made payable to the President. No reduction in the bill for board will be made for a period less than one week, except by special arrangement at the office.

FEES AND EXPENSES.

	Lowest.	Highest.
Tuition, free to students from Arizona		
Tuition, students non-residents of Arizona, each semester	$10.00	$10.00
Maintenance fee (deposit) by students in men's dormitory	3.00	3.00
Mining excursions for advanced students	20.00	40.00
Military uniform, cadet grey	16.25	24.00
Military uniform, khaki	7.25	10.00
Books, per annum	5.00	20.00
Board, per month	17.00	20.00
Lights per room, per month	.50	1.50
Napkins	.50	.50

LABORATORY FEES.

Assaying. See Metallurgy 2.	
Botany 1, 2, 3, 4, each	$ 2.50
Chemistry 1, 2, 3, 4, 5, 6, each	12.00
Chemistry III, (Preparatory, year)	12.00
Civil Engineering 1, 2,(year)	3.00
Mechanic Arts I, II, 1, 2 (each year)	5.00
Metallurgy 2 (Assaying)	25.00
Mineralogy 1, 2, (year)	15.00
Mineralogy 3, 4, (year)	5,00
Physics 1, 2 (year)	2.00
Physics IV (year)	3.00

Text-books may be obtained directly from the publishers through a book association managed on the co-operative plan under the direction of the faculty.

Members of the cadet companies will be required to provide themselves with the prescribed uniform, which will be ordered by the University. The cost of the cadet grey, woolen uniform, which must be deposited in advance, averages about $16.25. The uniform has shown better wearing qualities than a civilian suit of equal cost, and parents are urged to consider the matter of uniform when supplying their sons with clothing for the approaching University year. It may be worn on all occasions, and thus will remove the necessity for additional expenditure for outer clothing other than overcoats. When the warm weather of spring comes, the students are expected to purchase the regulation khaki uniform and campaign hat, the total expense being about $7.25.

ASSISTANCE TO STUDENTS.

The University has at present no loan funds with which to aid students who must earn their way. Various positions about the grounds, buildings and laboratories of the University, paying from $4 to $20 per month, are filled by students who must be self-supporting. The number, however, is not large, and preference is given to students from Arizona and to those who have spent time enough in the University to demonstrate that they are earnest, capable, reliable young men, likely to do this outside work and at the same time maintain a good record as students. During the current academic year forty-two different students have thus received assistance, totaling $2700, or an average of $64.

The Philo Sherman Bennett scholarship was constituted by the gift of $500 to the University in 1905, through the agency of Mrs. William Jennings Bryan, to be used in aiding young women to secure an education. The income will be awarded to a deserving applicant in the year 1908-9.

REQUIREMENTS FOR ADMISSION.

Applicants for admission to any department of the University will be required to furnish satisfactory evidence of good moral character, and certificate of graduation or of honorable dismissal from the schools with which they were last connected.

For admission to the Freshman class, applicants must be at least sixteen years of age and must satisfy requirements in subjects sufficient to give sixteen credits as described below. A credit is understood to be the equivalent of one study pursued satisfactorily at least four times a week for one year. as ordinarily taught in high schools.

Students coming from approved high schools and preparatory schools, and presenting a detailed official statement of work completed from the principals of such schools, will be excused by the committee on registration from entrance examinations in those subjects covered by the credentials, with the exception of English composition. Other students will be required to pass the entrance examinations.

For admission to the course leading to the degree of Bachelor of Philosophy, the subjects and credits assigned each are:

English	4	Latin	3
Algebra and Plane Geometry	2	Greek, French, German or Spanish	2
History and Civics	2	Elective	2
Science	2		

For admission to the course leading to the degree of Bachelor of Science, including the degrees of Bachelor of Science in Mining Engineering, Civil Engineering, Mechanical Engineering, of Metallurgy, the subjects and credits assigned each are:

English	4	French,German or Spanish	2
Mathematics	4	Physics and Chemistry	2
History and Civics	2	Elective	2

SCOPE OF THE ADMISSION REQUIRMENTS.

ENGLISH.

ENGLISH—4 credits. (a) English classics. An acquaintancewith the works named below. These worksaredivided into two classes,those intended for thorough study and those intended for general reading. The portion of the examination devoted to the former class will be upon subject matter, form and structure. In addition, the candidate may be required to answer questions involving the essentials of English grammar, and the leading facts in those periods of English literary history to which the prescribed books belong. In the portion of the examination devoted to the latter class, the candidate will be required to present evidence of a general knowledge of the subject matter, and to answer simple questions on the lives of the authors. The form of the examination will usually be the writing of a paragraph or two on each of several topics, to be chosen by the candidate from a considerable number—perhaps ten or fifteen—set before him in the examination paper. The treatment of these topics is designed to test the candidate's power of clear and accurate expression, and will call for only a general knowledge of the substance of the books. In preparation for this part of the requirement, it is important that the candidate shall have been instructed in the principles of writing English. A knowledge of grammar is presupposed. (b) English Composition. The examination will take the form of a theme of five hundred words on some subject familiar to the candidate and will be a practical test of his ability to express himself in writing clearly and consecutively. No candidate will be accepted whose work is notably defective in point of neatness, spelling, punctuation, idiom, or division into paragraphs. Those found lacking in composition will be required to make good the deficiency at once in a special class organized for that purpose.

No student will be admitted without examination, except on the certificate from his former instructors that the entire requirement has been fulfilled. Substantial equivalents, properly certified, will be accepted.

For thorough study, for 1910: Shakespeare's *Macbeth*, Milton's *Lycidas*, *Comus*, *L'Allegro* and *Il Penseroso;* Burke's *Speech on Conciliation with America* or

Washington's *Farewell Address* and Webster's *First Bunker Hill Oration;* Macaulay's *Life of Johnson* or Carlyle's *Essay on Burns.*

For general reading and practice, selections will be made, at the discretion of the teacher from groups I-VI of College Entrance Requirements in English for 1910-11.

MATHEMATICS.

ALGEBRA—1 1-2 or 2 credits. The work required in algebra covers the usual fundamental subjects, and extends through quadratic equations, radicals, and proportion, as given in Wells' *Essentials of Algebra,* or Wentworth's *High School Algebra.*

PLANE GEOMETRY—1 credit. A year devoted to the subject as treated in the textbooks of Wells or Wentworth, emphasizing original exercises.

SOLID GEOMETRY—1-2 credit. A half year should be given to this subject, emphasizing the geometry of the sphere and the original exercises.

TRIGONOMETRY—1-2 credit. Both plane and spherical trigonometry are required. The student should be familiar with the use of logarithmic and trigonometric tables.

HISTORY.

To meet the requirement in history the student will be expected to have used a good textbook, to have done regular reference work, and to have kept a notebook with outlines, summaries, maps, and topical notes on readings, varying in proportion, according to the advancement of the course.

ANCIENT HISTORY—to the year 800 A. D. 1 credit.

MEDIAEVAL AND MODERN HISTORY OF EUROPE—1 credit.

HISTORY OF ENGLAND—1 credit.

HISTORY AND GOVERNMENT OF THE UNITED STATES—1 credit.

LANGUAGE.

*GREEK—2 credits. As covered by Gleason and Atherton's *Beginners' Greek Book;* Xenophon's *Anabasis*, four books; Homer's *Iliad*, three books, with composition and use the of Hadley and Allen's or Goodwin's *Greek Grammar*.

*LATIN—2, 3 or 4 credits. As covered by Collar's *First Latin Book* and *Viri Romae*, together with Allen and Greenough's *Grammar* and texts; sight reading; Cæsar, four books, or an equivalent; Cicero, four orations; Virgil, six books; sight reading from Nepos, Cicero and Gellius; Daniell's or Bennett's *Prose Composition*.

*GERMAN—2 credits. As covered by Bacon's *German Grammar*, with readings outlined for German 1, 2, 3, 4, or an equivalent.

*SPANISH—2 credits. As covered by Hills and Ford's *Spanish Grammar* with readings, etc., outlined for Spanish 1, 2, 3, 4, or an equivalent.

*FRENCH—2 credits. As covered by Fraser and Squair's *French Grammar* (Parts I and II) with readings, etc., outlined for French 1, 2, 3, 4, or an equivalent.

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*If any language is offered it must be to the extent of two credits, since a single year's study of a language in not considered of sufficient educational value to be entitled to credits.

SCIENCE.

PHYSICAL GEOGRAPHY—1 credit or 1-2 credit. A year or half year of work which should include the principles of the subject, as treated in the best recent text-books, field and laboratory study, and the interpretation and steady use of topographic and weather maps, charts, etc. This subject may be combined in half-credits with botany, zoology, or physiology, which may in their turn be offered as full credits if it is so desired.

BOTANY—1 credit or 1-2 credit. The course should cover a study of the life histories of types from the main groups of plants, and a series of simple physiological experiments. At least two-thirds of the course should consist of laboratory work.

CHEMISTRY—1 credit. A year's course of descriptive chemistry, consisting of both class-room and laboratory work, which should include the more common metals and non-metals and their compounds. A careful record of laboratory experiments should be kept.

PHYSICS—1 credit. Along with the use of one of the standard text-books the year's course should include continuous and systematic laboratory practice, which should be recorded in a notebook.

ELECTIVES.

The electives offered for admission should be chosen from any other subjects ordinarily taught in high schools and accepted by reputable colleges and universities.

ADMISSION TO ADVANCED STANDING.

Students coming from other institutions of recognized standing may be admitted to classes above Freshman upon the presentation of properly authenticated certificates of work done, and when so admitted will be credited upon the records of this University with so much of such work as corresponds approximately with the courses required for the desired degree here. Certificates of record should be accompanied by statements of honorable dismissal or leave of absence, and a copy of the register or catalogue showing the content of the credits certified.

ADMISSION FROM ARIZONA NORMAL SCHOOLS.

By arrangements with the Arizona Normal School at Tempe, and the Northern Normal School at Flagstaff, students from these institutions will be received into the University without examination, and given credit for all work which is the equivalent of courses offered by the University either for admission or for a degree. Students from this University may also obtain the equivalent privilege at the Normal Schools by presenting the proper certificate of standing, signed by the president.

ADMISSION UPON CERTIFICATE.

Since the statutes of Arizona provide that the course of study in the high schools of the Territory "shall be such as, when completed, shall prepare its students for admission into the Territorial University," the University admits without examination, save in English composition, graduates of approved high schools of Arizona. Diplomas or corresponding credentials from high schools and preparatory schools in other states, accredited by the universities of such states, will excuse from examinations in the subjects covered by such credentials, save in English composition.

Accredited four-years high schools in Arizona:

Bisbee,
Clifton,
Douglas,
Mesa,
Phoenix,
Prescott.

High schools with approved courses not yet in full operation:

Globe,
Tempe,
Tombstone,
Tucson.

COURSE OF STUDY AND DEGREES.

All facilities and privileges of the University are open to qualified persons of both sexes.

The University offers four-years courses of study leading to the degrees of Bachelor of Philosophy and Bachelor of Science, and to those degrees specialized as shown on pages 54-56. In each course the work is partly required and partly elective, as described by schedules later. Each student doing full work is required to take not less than fifteen hours of class room work per week. In laboratory work a period from two to three hours is considered the equivalent of one recitation or lecture hour.

Persons of mature age and with sufficient preparation, who are not candidates for degrees, may be admitted to regular classes as special students, provided, however, that in all such cases they show to the satisfaction of the instructors in charge that they can take the course with profit to themselves and without detriment to the regular class. It is expected that those who desire thus to specialize in mineralogy, assaying, geology or surveying, will have had at least a high school education, or its equivalent, particularly in English, algebra, geometry, physics and chemistry.

The faculty reserves the right to omit classes in any course of instruction unless a suitable number of students register for the course.

Students who complete satisfactorily the required work, and the specified amount of elective work, as shown in the accompanying schedules, will be given the degree of Bachelor of Philosophy or Bachelor of Science. The special character of any course of study is indicated by adding to the degree the name of the department, as: Bachelor of Science in Mining Engineering, of Bachelor of Science in Metallurgy.

Military science and tactics and physical training are required during the freshman and sophomore years for all male students, and physical training for female students. If for any reason a student is excused from these exercises, an additional subject having a minimum of three recitation hours per week will be required.

Credit towards degrees is given by means of a unit system which assigns to each course of instruction offered a certain number of units of credit. A unit ordinarily represents one class-room hour per week, or its equivalent of two or three laboratory hours, for one semester. One hundred and thirty-one units, including three units in military science and tactics and physical culture, are required for obtaining a degree in any of the courses.

Any candidate for a degree may present as part fulfillment of requirements for graduation an acceptable thesis embodying the result of a special study of some subject within the range of the course pursued. The subject of the thesis must be submitted for the approval of the faculty at the opening of the senior year, and the completed thesis must be presented not later than three weeks before Commencement day. The credit value will be determined by the faculty at the time the subject is approved.

GROUPS OF SUBJECTS.

General:
English, Philosophy, Mathematics, Military Science, Physical Training.

Group A:
Latin, Greek, French, German, Spanish.

Group B:
Economics, History, Law, Sociology.

Group C:
Agriculture, Astronomy, Botany, Chemistry, Geology, Mineralogy, Physics, Zoology.

Group D:
Civil Engineering, Mechanic Arts, Mechanical Engineering, Metallurgy, Mining Engineering.

REQUIREMENTS FOR DEGREES.

The units necessary for the different degrees are set forth in the following tabulations:

	Required	Free elective.
Bachelor of Philosophy:		29
English	24	
Philosophy	12	
Mil. Science, Physical Training	3	
Group A	32	
Group B	15	
Group C	16	

Total, 131 units.

Bachelor of Science:

	Required	Elective
		44
English	8	
Mathematics	16	
Mil. Science, Physical Training	3	
Group B	4	
Group C and Group D	56	

Total, 131 units.

CIVIL ENGINEERING.

(See Mining Engineering, p. 56, for First and Second Years.)

III YEAR.	UNITS	IV YEAR.	UNITS.
Math. 5, 6	9	Civ. Eng. 3, 6	5
Astron. 2	3	Civ. Eng. 7, 8	8
Mineral. 1	4	Civ. Eng. 13, 15	6
Physics 4	4	Mech. Eng. 1, 2	6
Civ. Eng. 9, 11, 14	12	Elective	5
	32		30

METALLURGY.

(See Mining Engineering, p. 56, for First and Second Years)

III YEAR.	UNITS	IV YEAR.	UNITS
Math. 5, 6	9	Metal. 1, 3, 4, 5, 7, 9, 10	13
Mineral. 1, 2	7	Min. Eng. 1, 2	4
Geol. 1, 2	8	Civ. Eng. 14	4
Chem. 5, 6	8	Geol. 3	3
		Mech. Eng. 1, 2	6
	32		30

MINING ENGINEERING.

I YEAR.	UNITS	II YEAR.	UNITS	III YEAR.	UNITS	IV YEAR.	UNITS
English 1, 2	6	Math. 3, 4	6	Math. 5, 6	9	Min.Eng. 1, 2, 3, 4,7	8
Math. 1, 2	10	Phys. 1, 2	8	Mineralogy 1, 2	7	Geol. 3, 4	6
Chem. 1, 2	8	Chem. 3, 4	6	Geology 1, 2	8	Geol. 5, 6, and Mineral. 3,4 or Mech. Eng. 1, 2, 3, 4, or Civ. Eng. 6, 7, 11,	12
Mech. A. 1, 2	4	Met. 2	2	Met. 3, 5A,or 7, 5B	4	Elective	4
Mech. A. 3, 4	4	Mech. A. 5, 6	4	Civ. Eng. 14, or Geol.7 and Chem.10	4		30
Mil. Sci	1	Civ. Eng. 1, 2	8		32		
Phys. Training	½	Mil. Sci	1				
	33½	Phys. Training	½				
			35½				

MECHANICAL ENGINEERING.

I YEAR.	UNITS	II YEAR.	UNITS	III YEAR.	UNITS	IV YEAR.	UNITS
(See Mining Engineering for First year)		Math. 3, 4	6	Math. 5, 6	9	Mech. Eng. 5, 5	6
		Phys. 1, 2	8	Mech. Eng. 1, 2,	6	Mech. Eng.7,8	4
		Mech. A. 5, 6	4	Civ. Eng. 5, 6	8	Mech. Eng. 9, 10	6
		Mech. Eng. 3, 4	6	Phys. 3, 4	7	Civ. Eng. 14	4
		Civ. Eng. 1, 2	8	Mech. A. 7, 8	4	Elective	10
		Mil. Sci.	1		34		30
		Phys. Training	½				
			33½				

ADVANCED DEGREES.

Advanced degrees will be given only for work done in residence. 30 units of such work will be required for the degrees of Master of Arts, Master of Science, and Engineer of Mines, together with a thesis. The courses in each case will be laid out by those in charge of the departments in which the work for the degree is to be taken, and must be approved by a committee composed of all the heads of departments.

Students who expect to make mining engineering their profession are advised to take a fifth year, or a five-years course, since the four-years course gives insufficient time for a student to master all the subjects that are essential for the practice of mining engineering, with its requirements of a knowledge of following, mining, and handling ore, of the working out of the geology of an ore body and the fault systems which affect it, and of the principles and practices of ore reduction. Six months of work underground and in smelters, with a satisfactory detailed report on the same, will be required. This work may be done during summer vacations.

COURSES OF INSTRUCTION.

Courses having odd numbers are given in the first semester; those having even numbers, in the second semester. The hours mentioned show the number of periods per week. The subjects are arranged alphabetically.

*AGRICULTURE.

PROFESSOR CLOTHIER AND MR.————

1. **Plant Culture and Orchard Management.**

PROFESSOR CLOTHIER.

Elementary plant physiology, taking up the process of seed germination; the function of roots, stems, leaves, buds, flowers; the plant as affected by unfavorable environment. Plant propagation. Selection of orchard site; lifting, packing, shipping and transplanting trees and vines; cultivation, pruning, spraying, picking, packing and marketing fruits. Open also to preparatory students.

5 hrs., first semester. 4 units.

2. **Home and Market Gardening.** PROFESSOR CLOTHIER.

Practical and theoretical training in the general principles underlying successful intensive farming and the adaptability of Arizona for this branch of farming.

3 hrs., second semester. 2 units.

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*These Courses in Agriculture are also open to students in the Short Course in Agriculture.

3, 4. Breeds of Farm Animals. MR.——————

The history of the origin and development of the various breeds of farm animals. Their leading characteristics. Practice in stock judging.

3 hrs., first semester; 2. hrs., second semester. 4 units.

***5. Dairying.** Mr.——————

Production of sanitary milk on the farm, the management and care of a dairy herd, the composition and properties of milk, the manufacture of dairy products.

5 hrs., first semester. 4 units.

6. Farm Management. PROFESSOR CLOTHIER.

The course in farm management will deal with the laying out of ranches or farms with reference to arrangement of ditches, buildings, roadways, pumping plants; application of water—ridge culture, flooding on slopes, on dead levels; cultivation with reference to moisture, alkali, sediments, weeds, latent fertility, control of climatic conditions, management of alkali; crop production, successions and rotations, marketing of farm produce, business aspects of farming, such as shipping associations, markets, transportation, and farm bookkeeping.

3 hrs., second semester. 3 units.

7. Irrigation Engineering. PROFESSOR WATERBURY.

Measuring and handling of ditch water, pumping plants, steam and gasoline engines, electric motors.

5 hrs., first semester. 4 units.

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*Offered 1909–10

***8. Soils.** PROFESSOR CLOTHIER.

Origin, composition, and classification of soils; soil moisture and methods of conserving it, soil temperature and conditions influencing it, soil texture as affecting the supply of heat, moisture, and plant food; various culture methods in relation to soil texture, and plant food, surface tension capillarity, osmosis and diffusion as affecting soil conditions; root development, mechanical analysis of soils.

5 hrs., second semester. 4 units.

***9. Poultry Husbandry.** MR. ————

The general care and management of poultry, production of poultry products for the market, diseases and pests, characteristics of breeds.

3 hrs., second semester. 3 units.

***10. Veterinary Science.** MR. ————

Animal physiology, sanitation, symptoms of common diseases and pests, and their remedies.

5 hrs., second semester. 4 units.

***11. Feeds and Feeding.** MR. ————

The principles of animal nutrition, composition and digestibility of various feeds, construction and use of silos, economical feeding of animals for various purposes, balanced rations.

3 hrs., second semester. 3 units.

***12. Principles of Breeding.** MR. ————

Principles governing breeding of plants and animals. Mendel's Law of Hybrids, modern practice in breeding,

5 hrs., second semester. 4 units.

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*Offered 1909–10

***14. Market Classes of Farm Animals.** MR. ———————

Common classifications of horses, mules, cattle, sheep, and swine, used by market buyers.

2 hrs., second semester. 2 units.

ASTRONOMY.

PROFESSOR DOUGLASS.

The atmosphere of Southern Arizona is perhaps the best in the United States for astronomical observation, having smaller percentage of cloud and less average wind velocity than any other locality where records have been preserved. The dry air and 2400 feet elevation give Tucson such a clear sky that faint stars may be watched till they set behind the distant horizon; the fine weather, day after day, gives opportunity for consecutiveness of observation not obtainable elsewhere; a greater portion of the year is available, with less interference from air currents.

The course in astronomy is arranged especially to draw attention to these advantages, and, at the same time, to give that understanding of the motions of the earth and planets which is so important in many branches of engineering. The eight inch Harvard telescope with its Clark glass and the four and one-fourth inch Brashear telescope of the University will always be available for closer study of the heavenly bodies. Two excellent clocks with electric connections for transmitting time give opportunity for longitude, latitude and time observations. It is hoped in the coming year to install other instruments that will take advantage of the exceptionally favorable conditions so peculiar to Arizona.

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*Offered 1909–10

1. **Descriptive Astronomy.** PROFESSOR DOUGLASS.

The study of the sun, moon and planets and other celestial objects, with constant views of their telescopic appearance and discussion of the latest theories of the evolution of the universe and the condition of the planets. Non-mathematical; open to all students.

2 hrs., or an equivalent, both semesters. 4 units.

2. **Engineering Astronomy.** PROFESSOR DOUGLASS.

Latitude, longitude and time observations, and their reductions, with practice work; astronomical measurement; adjustment and handling of instruments. Required of sophomores in civil engineering.

3 hrs., or an equivalent, second semester. 3 units.

BIOLOGY.

PROFESSOR THORNBER, MISS TILLMAN.

The courses which follow are calculated to articulate with the work done in biology in the average western high school.

The Desert Botanical Laboratory of the Carnegie Institution of Washington, D. C.,is located on the mountain just west of Tucson. In this laboratory, the southwest with its unique and, as yet, little investigated flora, gains what is destined to be one of the important centers of active, scientific research. The research facilities of the laboratory are all that could be desired, and the investigations upon the desert flora will appeal to students of botany from all quarters. In the light of the above, the importance of the Desert Botanical Laboratory to the University of Arizona and especially to this department will be apparent.

1, 2. General Botany. MISS TILLMAN.

The first part treats of histology and morphology, and the second part of elementary physiology of plants. Bergen and Davis, *Principles of Botany,* is used as a textbook. Open to all college students.

4 hrs., or an equivalent, both semesters, M T W TH, 1-3. 8 units.

3, 4. Plant Geography. PROFESSOR THORNBER.

Discussion of factors governing plant distribution. Study of habitat and taxonomic groups of the native flora. Opportunity is offered for advanced work. Open to all students having an equivalent of Biology 1, 2.

4 hrs., both semesters. 8 units.

***5, 6. General Zoology.** PROFESSOR THORNBER.

A comparative study of the representative invertebrate types is made. Parker and Haswell's *Manual of Zoology,* is used as a textbook. Dodge's *Elementary Practical Biology* is used in the laboratory. Open to all college students.

4 hrs., or an equivalent, both semesters. 8 units.

CHEMISTRY.

PROFESSOR GUILD (ABSENT ON LEAVE, 1908–9) ASSISTANT PROFESSOR BENNER, MR. CALLOWAY.

The instruction in chemistry has two main objects in view: first, to promote general culture; and second to introduce students to technical work, especially in mining. The first two years' work in general chemistry, qualitative and quantitative analysis, places the student in a position to take up advantageously the study of mining, agricultural chemistry or metallurgy.

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*Omitted 1908–09.

1, 2. General Chemistry and Quantitative Analysis. ASSISTANT PROFESSOR BENNER AND MR. CALLOWAY.

Lectures and recitations illustrating the chemical properties of the elements and their compounds. Textbooks, Newth's, *Inorganic Chemistry*, Elliot and Storer's, *Qualitative Analysis* and various reference books. Open to all students who have taken courses amounting to one year each in preparatory chemistry and physics.

2 hrs., and two 3-hr. laboratory periods, both semesters, T TH, 10, TH F, 1-4. 8 units.

3. Quantitative Analysis.

ASSISTANT PROFESSOR BENNER.

Laboratory practice with lectures and recitations; the work will be chiefly in gravimetric methods of analysis. Open to all students who have taken Chemistry 2.

4 hrs., or an equivalent, first semester, M T W, 1-4. 4 units.

4. Volumetric Analysis.

ASSISTANT PROFESSOR BENNER.

A continuation of the work in Chemistry 3, special attention being given to the methods of assaying employed in the West.

4 hrs., or an equivalent, second semester. 2 units if discontinued March 15th; otherwise, 4 units.

5, 6. Special Quantitative Analysis.
ASSISTANT PROFESSOR BENNER.

The analysis of water, gases, oils, minerals. Open to students who have taken Chemistry 4.

4 hrs., or an equivalent, both semesters. 8 units.

***7, 8. Organic Chemistry.** PROFESSOR GUILD

Lectures on the carbon compounds; laboratory work in organic analysis and the preparation of organic compounds; vapor density and molecular weight determination. Open to students who have taken Chemistry 3, 4.

4 hrs., or an equivalent, both semesters. 8 units.

***9. Synthetic Chemistry.** PROFESSOR GUILD.

The preparation of pure chemical compounds from the crude mineral products. Open to students who have taken Chemistry 4.

2 hrs., or an equivalent, first semester. 2 units.

***10. Physical Chemistry.** PROFESSOR GUILD.

Lectures. Historical introduction leading up to a discussion of modern chemical theories. Open to students who have taken Chemistry 3.

2 hrs., second semester. 2 units.

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*Omitted 1908–09.

***11, 12. Chemistry of the Rare Elements.**
ASSISTANT PROFESSOR BENNER.

The analysis and synthesis of uranium, molybdenum, tungsten, vanadium and cerium compounds. Open to students who have taken Chemistry 6, 9.

4 hrs., or an equivalent, both semesters. 8 units.

CIVIL ENGINEERING.

PROFESSOR WATERBURY.

The courses in this department have been arranged with special reference to the engineering development of the Southwest. Stress will be laid on surveying, railroad and structural work, and irrigation engineering. The design throughout the courses is to give the student a thorough and practical knowledge of the essential principles of his profession, and to teach the technical practice of the times, so far as possible, without sacrificing in other directions.

1, 2. Surveying. PROFESSOR WATERBURY.

Use and care of surveying instruments, United States system of land surveys, city surveys, topographical and hydrographical surveying, mine surveying, and earthwork computations. Lectures, recitations, drawing, and fieldwork. Textbook, Johnson's *Surveying*. Open to students who have taken trigonometry, and who have taken or are taking Mechanic Arts, 1.

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*Omitted 1908–9.

4 hrs. both semesters, M W F, 11 (lectures), and S, 9-12 (fieldwork). 8 units.

***3. Geodesy.** PROFESSOR WATERBURY.

Size and shape of the earth; latitude, longitude and azimuth determinations; base line apparatus; triangulation; and trigonometric leveling. Open to students who have taken Civil Engineering 1, 2,and Astronomy 2.

1 hr., first semester. 1 unit.

6. Concrete and Masonry Construction.

PROFESSOR WATERBURY.

The theory and practice in reinforced concrete construction. Foundations on land and in water, coffer-dams, cribs, caissons, piers and abutments, retaining walls, dams, and arches. Open to students who have taken Civil Engineering 14.

3 hrs., and one 3-hour laboratory and drafting period, second semester. 4 units.

***7. Steel Mill Buildings.** PROFESSOR WATERBURY.

Graphical and analytical computation of stresses in roof and bridge trusses; a study of the details of structural steel designing; complete design with drawings, estimate of weights, and estimate of cost for a steel mill building. Text-book, Ketchum's *Steel Mill Buildings.* Open to students who have taken Civil Engineering 14.

2 hrs., and two 3-hour drafting periods, first semester. 4 units.

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*Omitted 1908–9.

***8. Bridge Design.** PROFESSOR WATERBURY.

Computation of stresses due to moving loads upon various points of bridge structures; a detailed study of bridge designs and bridge erections; complete design with drawings, estimate of weights, and estimate of cost of a steel bridge. Text-book, Ketchum's *Design of Highway Bridges*. Open to students who have taken Civil Engineering 7.

2 hrs., and two 3-hour drafting periods, second semester. 4 units.

***9. Railroad Engineering.** PROFESSOR WATERBURY.

Preliminary and location surveys; simple and easement curves, turnouts and switches; principles of economic location as based upon cost of construction, operating expenses, alignment, and grades; maintenance of way. The fieldwork consists of the surveys for a railroad of sufficient length to secure familiarity with the methods of actual practice. Each student makes a complete set of notes, maps, profiles, calculations and estimates of cost. Text-book, Allen's *Railroad Curves and Earthworks*. Open to students who have taken Civil Engineering 1, 2.

3 hrs., and Saturday forenoons, first semester. 4 units.

11. Hydraulics. PROFESSOR WATERBURY.

Velocity and discharge from orifices, weirs, tubes and pipes; flow in sewers, ditches, canals and rivers; measurement of water power; water wheels of various types. Text-book, Merriman's *Hydraulics*. Open to students who have taken Civil Engineering 1, 2 and Mathematics 4

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*Omitted 1908–9.

4 hrs., first semester. 4 units.

*13. **Principles of Irrigation.** PROFESSOR WATERBURY.

A study of the present condition of irrigation development in the United States; irrigation legislation; methods of establishing rights to water; a brief reference to the engineering principles relating to the construction and maintenance of canals and reservoirs and the various means of diverting and measuring water for use in irrigation. Text-book, Wilson's *Irrigation Engineering*. Open to students who have taken Civil Engineering 1, 2, 11, 14.

3 hrs., and one 3-hour laboratory and drafting period, first semester. 4 units.

14. **Materials of Construction.**

PROFESSOR WATERBURY.

The properties and uses of stone, brick, lime, cement, concrete, timber, iron, and steel. The computation of stresses in prisms, beams, columns, and shafts. Lectures, recitations, and laboratory work. Text-book, Merriman's *Mechanics of Materials*. Open to students who have taken or who are taking Mathematics 5, 6.

3 hrs., and one 2-hr. laboratory period, second semester. 4 units.

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*Omitted 1908–9.

***15. Contracts and Specifications.**

PROFESSOR WATERBURY.

The essential elements of a contract; items included in various kinds of engineering contracts and specifications; the preparation of a complete set of specifications and a contract. Text-book, Johnson's *Engineering Contracts and Specifications*. Open to all college students.

2 hrs., first semester. 2 units.

ECONOMICS.

PRESIDENT BABCOCK, ASSISTANT PROFESSOR CHANDLER.

1. Introduction to Economic Theory.

ASSISTANT PROFESSOR CHANDLER.

A study of the main principles which underlie the science, with special reference to illustrations of their workings in the growth of industry and commerce in England and the United States. Although the work of this course is essentially theoretical, no opportunity is lost to supplement the study with practical illustrations drawn from business activities of today. Seager's *Introduction to Economics* is used as the basic text. Open to all college students.

3 hrs., first semester, M W F, 10. 3 units.

2. Industrial and Tariff History of the United States.

ASSISTANT PROFESSOR CHANDLER.

A study of the rise of the factory system in the United States, and the origin and development of the leading American industries. The history of the tariff from 1789 to 1909 and its influence upon the development of manufacturing and the growth of trusts, as well as its effect upon wages and fixed salaries. Tariff reform. Open to all college students who have had Course 1.

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*Offered 1909–10

3 hrs., second semester, M W F, 10. 3 units.

*2a. Money, Credit and Banking.

ASSISTANT PROFESSOR CHANDLER.

A thorough study of the functions of money and its relation to credit instruments and institutions. Also the theory and history of banking, tracing the development from the 15th to the 20th century. The principal banking systems of Europe are studied with a view to finding ideas which may be adapted to American conditions in order to render the American system more nearly conformable to our growing financial and commercial needs. Recent financial crises and their connection with our present currency and banking system. Open to all college students who have had Course 1.

3 hrs., second semester. 3 units.

*3. Economic History and Commercial Geography.

ASSISTANT PROFESSOR CHANDLER.

Commercial and industrial history from the middle of the 18th century. The development of industry and commerce is traced to the present time. The genesis and evolution of modern economic ideas. The latter part of the course will include a general review of modern world commerce and the chief resources as well as the

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*Offered in 1909–10 and in alternate years.

different systems of transportation upon which commerce depends. Open to all college students.

2 hrs., first semester, T TH, 10. 2 units.

***4. Modern Business Organization.**

ASSISTANT PROFESSOR CHANDLER.

Twentieth century methods of organizing and carrying on business. Problems attending the expansion of corporate enterprise and the growth of trusts. Legal status of the corporation; relations of corporation to business supremacy; methods of promotion and capitalization; monopoly price and methods; effect of trust development upon prices, wages and profits; the struggle of the independent entrepreneur; relation of government to industrial and commercial enterprise; railway rate regulation and anti-trust laws. Open to all college students who have had course 1 or 4.

2 hrs., second semester, T TH, 11. 2 units.

*** *5. History and Development of Industrial Society.**

ASSISTANT PROFESSOR CHANDLER.

A study of industrial development from the 12th to the 20th century with a view to finding the origin of modern social and industrial institutions, customs and rights, the historic foundation of special rights and privileges enjoyed by various classes today, including English common law rights of employer and employee, right to own and enjoy private property, freedom of contract, etc. Special attention will be given to the varying application of these rights to the new conditions accompanying the industrial revolution and the spread of the factory system. Also an inquiry into the relation existing between the efficiency of man as a factor in production and the conditions which surround him in his home and social life.

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*Offered in 1909–10, and alternate years.

**Offered in 1910–11, and alternate years.

2 hrs., first semester. 2 units.

****6. The Labor Question.**

ASSISTANT PROFESSOR CHANDLER.

This course logically follows Course 6. It will consist of an intensive study in a limited field of the problems set forth in Course 6 as they affect the status of the laboring population today. In addition to the history and growth of labor organizations, place will be given to the following questions: strikes and lockouts, the closed shop, the secondary boycott, organized labor vs. organized capital, federal intervention, the use of the injunction and recent judicial decisions, the effectiveness of unions in raising the standard of living, etc.

2 hrs., second semester. 2 units.

PUBLIC LECTURES.

1909—10

In connection with the departments of history and economics, a series of lectures dealing with practical problems of the day will be given during the year 1909-10. These lectures, open to the public, will be given by business and professional men of Arizona, upon subjects concerning which the speakers can present first-hand knowledge. The chief purpose in offering these lectures is to bring the students of economics into actual contact with the practical side of the questions with which the science deals. The following is a list of the lectures which will be given:

**Offered in 1910-11 and alternate years.

October 1. **Life Insurance—Its Relation to the Public and the Individual.**

MR. F. O. BRISTOL, General Agent for the Northwestern Mutual Life Insurance Company in Arizona, Phoenix.

October 22. **Our Farmers and Our Future.**

DIRECTOR ROBERT H. FORBES, Agricultural Experiment Station, University of Arizona, Tucson.

November 12. **The Invisible Empire.**

MR. ALLEN T. BIRD, Editor of the "Oasis," Nogales.

A discussion of the railway development now taking place on the west coast of Mexico, under Arizona engineers, and the value thereof to the people of Arizona.

December 5. **The Economic Aspects of Mining.**

COLONEL WILLIAM HERRING, General Attorney for the Copper Queen Consolidated Mining Company, Tucson.

December 17. **The Economic Importance of Government Reclamation Work, with Especial Reference to Work in Arizona.** (Illustrated).

MR. LOUIS C. HILL, Supervising Engineer of the United States Reclamation Service, in charge of all work in Arizona and Southern California.

January 15. **The Relation of the Press to the Development of Arizona.**

COLONEL JAMES H. MCCLINTOCK, Postmaster, Phoenix.

February 4. **Principles and Practice in the Making of Railroad Freight Rates.**

MR. H. T. CORY, Assistant to the President of the Randolph Lines.

February 19. **Railroads and their Relation to the Increase of Population and Wealth in Arizona.**

MR. FRANK COX, Chief Counsel for the Southern Pacific Company in Arizona, Phoenix.

March 11. **The United States Consular Service.**

HON. THOMAS F. WILSON, Formerly in United States Consular Service, Tucson.

March 25. **The Purpose and Work of Commercial Organizations, with Special Reference to the Tucson Chamber of Commerce and its Relation to the Development of Arizona.**

MR. H. V. FAILOR, Secretary of the Chamber of Commerce, Tucson.

ENGLISH.

PROFESSOR BATES, MISS LUTRELL, MR. WALDRON.

The purpose of the literary courses outlined below is to give a general knowledge of English literature from its beginnings to the present time, chief stress being laid upon the study of representative authors, but with broader literary movements constantly in mind. The courses in composition aim to develop accurate thought and clear, vigorous expression; opportunity for work in advanced composition is afforded in connection with the courses in literature.

1. Composition.

PROFESSOR BATES (1908–09) and MR. WALDRON.

Narration and description; lectures and the study of Nettleton's *Specimens of the Short Story;* daily and weekly themes. Prescribed for all freshmen.

3 hrs., first semester, M W F, 10. 3 units.

2. Composition. PROFESSOR BATES and MR. WALDRON.

Exposition and argumentation; study of Perry's *Argumentation*, class debates, impromptu speeches, and frequent themes. Prescribed for all freshmen.

3 hrs., second semester, M W F, 10. 3 units.

3, 4. Nineteenth Century Prose.

MR. WALDRON (PROFESSOR BATES, 1909-10).

From the publication of the Lyrical Ballads to the death of Ruskin, 1798-1899. The following writers are studied: Lamb, Hazlitt, Leigh Hunt, Landor, DeQuincey, Macaulay, Thackeray, Carlyle, Ruskin, Newman, Arnold, and Stevenson. Weekly papers on assigned topics; lectures and discussions. Primarily for freshmen.

2 hrs., both semesters, T TH, 10. 4 units.

5, 6. Elizabethan Drama. PROFESSOR BATES.

Attention is given first to the development of the Elizabethan Drama from the Miracle Plays, Moralities, and Interludes; the Senecan influence is studied, and the work of Lyly, Greene, Peele, Kyd, and Marlowe briefly considered; then the bulk of the year is given to a close, detailed study of the leading plays of Shakespeare, followed by a cursory treatment of the post-Shakespearian drama, at least one play being read from each of the following writers: Jonson, Beaumont and Fletcher, Heywood, Webster, Middleton, Massinger, and Ford. Lectures and discussions, and a thesis of not less than 2,000 words.

3 hrs., both semesters, T TH F, 11. 6 units.

***7, 8. Eighteenth Century Prose.** PROFESSOR BATES.

From the death of Dryden to the publication of the Lyrical Ballads (1700-1798). The following writers are studied: Swift, Addison, Steele, Defoe, Richardson, Fielding, Smollett, Sterne, Johnson, Goldsmith, Burke, Walpole, Beckford, Burney. Weekly papers on assigned topics, lectures, and discussions.

2 hrs., both semesters, 4 units.

11. Poetry prior to the Nineteenth Century.

PROFESSOR BATES.

This course affords a brief introductory view of Anglo-Saxon literature (in translation), a discussion of medieval romances and ballads, and a study of Elizabethan lyrics, Spenser, Milton, the Augustans, and the forerunners of romanticism in the eighteenth century. Weekly papers on assigned topics, lectures, and discussions.

3 hrs., first semester M W F, 8. 3 units.

12. Poetry of the Nineteenth Century.

PROFESSOR BATES.

This course gives opportunity for the study of the following writers: Wordsworth, Coleridge, Scott, Byron, Shelley, Keats, Landor, Tennyson, Mrs. Browning, Robert Browning, Arnold, Rossetti, Morris, and Swinburne. Weekly papers on assigned topics, lectures, and discussions.

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*Omitted 1908–09, 1909–10.

3 hrs. second semester M W F at 8. 3 units.

***17. American Literature.** PROFESSOR BATES.

Lectures upon pre-revolutionary conditions, the Knickerbocker and New England schools, the contribution of the South, the National literature since the Civil War. Special study of Irving, Cooper, Bryant, Hawthorne, Emerson, Whittier, Holmes, Longfellow, Lowell, Poe, Lanier, and Whitman. 2 hrs. first semester. T TH, 8.

***18. .Contemporary Literature.** PROFESSOR BATES.

The aim of this course is to afford such a study of British and American literature in the last quarter-century as will enable the student to form a clear estimate of present-day tendencies. It covers the decadent and symbolic schools of British poetry, the Irish movement, contemporary American poetry, the romantic and realistic schools of fiction, and the revival of the drama, with especial reference to the influence of Ibsen. Readings assigned in the poetry of James Thomson, Wilde, Symons, Henley, Johnson, Yeats, Hovey, and Carman; in the novels of Kipling, Hewlett, Gissing, and Mrs. Ward; in the dramas of Ibsen, Pinero, Jones, Shaw, and Phillips. Lectures upon these and other authors.

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*To be offered 1909–10.

2 hrs., second semester, T TH, 9. 2 units

13, 14. Chaucer. MISS LUTRELL.

In this course a large part of the *Canterbury Tales* is read, the *Prologue to the Legende of Gode Wommen,* and some of the minor poems. The course is purely literary and a knowledge of Anglo Saxon is not required.

3 hrs., both semesters, T TH F, 9. 6 units.

***15, 16. .Nineteenth Century Fiction.**

PROFESSOR BATES.

Lectures upon the lives and general position of the following authors: Austen, Scott, Dickens, Thackeray, Emily Bronte, Charlotte Bronte, George Eliot, Reade, Meredith, Hardy, and Stevenson. One work is read from each of these writers, and its intellectual substance, literary style, plot, characterization, and atmosphere are discussed. A note-book containing impressions and analyses of the reading is kept by every student.

2 hrs., both semestesr, 4 units.

†19, 20. Principles of Literary Criticism.

PROFESSOR BATES.

For graduate students and seniors obtaining special permission. The course is designed both to develop ability in research work, and to enable the student from his examination of critical theory to form satisfactory canons of taste. It is conducted as a seminar with reports and theses. In the first semester the following authors are studied: Plato, Aristotle, Sidney,

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*Omitted 1909-10.

†To be offered 1909-10.

Dryden, Addison, Pope, Johnson, and Burke. The second semester is devoted to writers of the nineteenth century, especially Wordsworth, Coleridge, Shelley, Poe, Lanier, Arnold, Pater, and various contemporary critics.

Hours and credits to be arranged.

FRENCH.

PROFESSOR TURRELL, MISS ALDRICH.

1, 2. Elementary French. Miss ALDRICH.

First semester: Fraser and Squair, *French Grammar*, (Part I), Aldrich and Foster, *French Reader*. Second semester: Reading of Daudet, *La Belle Nivernaise*, Labiche and Martin, *La Poudre aux Yeux*, Halevy, *L'Abbe Constantin*. Composition and dictation, with drill on the irregular verbs.

5 hrs. both semesters, M T W TH F, 2:40. 8 units.

3, 4. Advanced French. MISS ALDRICH.

First semester: Fraser and Squair, *French Grammar*, (Part II), Merimee, *Colomba* or *Carmen*, Lamartine, *Graziella*, Sand, *La Mare au Diable* or *La Petite Fadette*. Second semester: Selected reading, including Canfield, *French Lyrics*, Victor Hugo, *Les Miserables* (abridged).

5 hrs., both semesters M T W TH F,. 8 units.

5. French Literature to the Nineteenth Century.

PROFESSOR TURRELL.

The classical French dramatists. Reading of plays of Corneille, Racine and Moliére. Lectures on the eighteenth century. Voltaire, Rousseau, Diderot, etc.

Beaumarchais, *Le Barbier de Seville.* Library readings.
3 hrs., first semester. 3 units.

6. French Literature in the Nineteenth Century.
PROFESSOR TURRELL.

Particular study of the drama. The Romanticists. Victor Hugo, Musset, Scribe, Augier, etc. Recent literary movements in France. Pailleron, Dumas, Rostand, Zola, Sardou, Hervieu, Maeterlinck, etc.
3 hrs., second semester. 3 units.

***7, 8. Advanced French Composition.**
PROFESSOR TURRELL.

Vreeland and Koren, *French Syntax and Composition*, Kron, *French Daily Life*, etc. Original essays and reports in French.
2 hrs., both semesters. 4 units.

Courses 5, 6, 7, 8 may be taken together or separately, but must be preceded by courses 1, 2, 3, 4.

GEOLOGY.

PROFESSOR TOLMAN AND MR. TARR.

The earlier courses in geology are constructed not only to introduce the student to general and applied geology, but with special reference to the development of the observational faculties, and training in inductive and deductive reasoning so that the student may discover for himself the causes for each phenomenon observed. The more advanced courses are technical and cover the essentials in geology for a mining engineer.

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*To be given 1909-10.

The courses in geological mapping allow the student to take advantage of the opportunities at hand for field work, and include reconnaissance and detailed field mapping and underground geological mapping. Special field work can be undertaken by advanced students under the direction of the department.

1, 2. **General Geology.** PROFESSOR TOLMAN.

Geological processes, their causes and effects. The atmosphere, surface and underground water, the ocean and the ice and snow as geological agents. Earth movements; mountain and continent building; vulcanism. Rocks, their origin and alterations. Historical Geology, reviewing the physical history of the earth and correlated life progress.

The laboratory work covers the reading and interpretation of topographical and geological maps, the fundamentals of geological mapping, structural problems, and stereogrammatic and graphic methods for the solution of problems in faulting. Short field trips are taken in the second semester. Open to students who have taken or who are taking Mineralogy 1, 2.

3 hrs. and one laboratory period, both semesters, M T W TH, 8. 8 units.

*3. .**Economic Geology—Non-Metallic Products.**

PROFESSOR TOLMAN.

Statistics, production, utilization, value, occurrence, genesis, and methods of investigation of iron and manganese and the non-metallic products, viz.: coal, oil, gas, bitumen, etc.; building stones, clays, cement materials, sands, etc.; borax, phosphates, fluorspar, gypsum, graphite, mica, asbestos, mineral paints, etc.; salines, mineral waters, artesian flows, and investigation of underground water flow, etc.; precious stones.

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*To be given 1909–10.

3 hrs., first semester. 3 units.

***4. Economic Geology—Metallic Products.**

PROFESSOR TOLMAN.

Detailed study of ore deposits. Prerequisite, Geology 1, 2.

3 hrs., second semester, 3 units.

****5, 6. Field Geology.** PROFESSOR TOLMAN and MR. TARR

Construction of maps and sections. United States Geological Survey methods of geological mapping. Geological mine mapping and stereography. Two detailed geological maps are required of each student, one of a portion of the Tucson mountains (lava flows) and one of a district in the Rincon mountains (faulted and folded sedimentary rocks), a sketch reconnaissance map, and a geological map of mine workings. Open to students who have taken or are taking Geology 3, 4 and Mineralogy 3, 4.

All day Saturdays, or equivalent, in the field, both semesters. 8 units.

****7. Type Fossils.** PROFESSOR TOLMAN.

Identification of the type fossils, especially of the Paleozoic.

2 hrs., first semester. 2 units.

**Omitted 1908—9.

Graduate Work. Advanced work in Economic and Field Geology can be arreangd for those working for the Master's Degree or that of Engineer of Mines.

GERMAN,

PROFESSOR TURRELL, MISS ROBERTS.

1, 2. Elementary German. MISS ROBERTS.

First semester: Bacon, *New German Gourse*, complete. Second semester: Reading of Storm, *Immensee*, von Hillern, *Hoeher als die Kirche*, Manley and Allen, *Four German Comedies*. Composition, dictation and continued grammar drill.

5 hrs., both semesters, M T W TH F, 2:40. 8 units.

3, 4. Advanced German. PROFESSOR TURRELL.

First semester: Pope, *German Composition*, with review of Syntax. Reading of Meyer-Foerster, *Karl Heinrich*, Heine, poems and *Die Harzreise*. Second semester: Composition continued. Lessing, *Minna von Barnhelm*, Schiller, *Wilhelm Tell*, etc.

5 hrs., both semesters, M T W TH F, 1:50. 8 units.

***5, 6. German Literature in the Nineteenth Century.**
PROFESSOR TURRELL.

First semester: The Romanticists and their successors. Class reading of Kleist, *Der Prinz von Homburg*, Grillparzer, *Der Traum ein Leben*, *Die Ahnfrau*, etc. Second semester: The rise of Naturalism and Symbolism. Wildenbruch, *Harold*, Fulda, *Der Talisman*, Sudermann, *Johannes*, Hauptman, *Die versunkene Glocke*. Lectures and library readings.

2 hrs., both semesters. 4 units.

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*Omitted in 1908–9.

Courses 5, 6, 7, 8 may be taken together or separately, but must be preceded by courses 1, 2, 3, 4.

***7, 8. Lessing, Schiller and Goethe.**

PROFESSOR TURRELL.

First semester: Reading and interpretation of Lessing, *Emilia Galotti*, *Nathan der Weise*, Schiller, *Maria Stuart*, *Wallenstein*. Accompanied by a brief outline of German Literature to the nineteenth century. Second semester: Goethe, *Hermann und Dorothea*, *Egmont*, *Die Italienische Reise*, *Faust*, Part I.

3 hrs., both semesters. 6 units.

GREEK.

MRS. NEWSOM.

1, 2. Beginner's Course. MRS. NEWSOM.

The work done is represented by White's *First Greek Book;* Goodwin's *Greek Grammar;* and Xenophon's *Anabasis* (first four books).

5 hrs., both semesters, M T W TH F, 9:50. 8 units.

***3, 4. Homer and Plato.** MRS. NEWSOM.

Homer's *Iliad* (first 4 books); Plato's *Apology* and *Crito;* and selections from Lysias.

5 hrs., both semesters. 8 units.

HISTORY.

PRESIDENT BABCOCK, ASSISTANT PROFESSOR CHANDLER.

In the work in history emphasis is placed on the social and political development, the relation of cause and effect, and the unity of history. The laboratory method is used whenever possible and individual work insisted upon.

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*To be given in 1909–10.

***1, 2. Political and Constitutional History of England.**
ASSISTANT PROFESSOR CHANDLER.

This course will cover the political history from Anglo-Saxon times to the battle of Waterloo. The development of the English constitution and the origin of other political and legal institutions contributed by England to modern civilization will be studied. Gardiner's *Students' History of England* is used as the general text, with Montague's *Constitutional History* for collateral study. Assigned readings, preparation of frequent reports and consultation of original sources where practicable. Open to all college students.

4 hours, both semesters. 8 units.

***3, 4. American Colonial History.** PRESIDENT BABCOCK

A detailed study of the American colonies under Great Britain, and of the United States to the adoption of the Constitution. Lectures, assigned reading and reports. Open to students who have taken History 1, 2.

3 hrs., both semesters. 6 units.

5, 6. Constitutional History of the United States.
PRESIDENT BABCOCK.

A detailed study of the formation of the Union and of the political and constitutional history of the United States down to 1856, based on letters and speeches of American statesmen, public documents and special histories. Open to students who have taken History 1, 2.

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*Omitted 1908–9

3 hrs., both semesters, T TH S, 8. 6 units.

7, 8, Great Movements in History. PRESIDENT BABCOCK.

Lectures, with readings, on the great forces of history and the forms of their manifestation—migrations, religions, political and economic revolutions, etc.

2 hrs., both semesters, M W, 11 4 units.

***9. The French Revolution and the Napoleonic Period.**
ASSISTANT PROFESSOR CHANDLER.

The causes, events and results of the French Revolution, and the spread of reform under Napoleon. The study of the revolution will be prefaced by a review of the state of European civilization in the middle of the eighteenth century and the influence of the French and English schools of literature, philosophy and economics as factors in the political and economic revolutions. Open to all college students.

3 hrs., first semester. 3 units.

***10. European History since the Congress of Vienna.**
ASSISTANT PROFESSOR CHANDLER.

A study of the liberal and reform movements, social, political, economic and intellectual, up to the present time; the evolution of constitutional government; the various movements towards national unity; the revolts of 1820, 1830 and 1848; the Eastern question; the Franco-Prussian war and the rise of Germany to a commanding position in World commerce and politics; English reform bills of 1832 and 1867, and other political, religious and social-industrial reforms. Open to all college students.

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*To be offered 1909–10.

3 hrs., second semester. 3 units.

LATIN.

MRS. NEWSOM.

The courses below are open to students who have completed the first three years of Latin in the sub-collegiate department, or an equivalent. Constant thorough drills are given in technical grammar and prose composition. In reading, the matter is subjected to grammatical, metrical, rhetorical and historical explanation. The study of the text is made the means of mental discipline, of developing the faculties of observation and critical judgment, and of acquiring habits of thoroughness and accuracy.

1, 2. **Virgil, Livy, and Cicero.** MRS. NEWSOM.

Virgil, *Æneid*, Books V and VI; Livy, Selections; Cicero, *de Senectute*, *de Amicitia*. Exercises in prose composition.

4 hrs., both semesters. 8 units.

3, 4. **Tacitus and Horace.** MRS. NEWSOM.

Tacitus, *Germania* and *Agricola*, Selections from Histories; Horace, *Odes*.

3 hrs., both semesters. 6 units.

MATHEMATICS.

PROFESSOR E. M. BLAKE, ASSISTANT PROFESSOR MEDCRAFT.

College Algebra. ASSISTANT PROFESSOR MEDCRAFT

One-fifth of the time of the course in college algebra is devoted to graphical methods. Prescribed for all freshmen in engineering courses.

4 hrs., and a 2-hr. laboratory period, first semester, M W TH F, 9, T, 8-10. 5 units.

2. Analytical Geometry.

ASSISTANT PROFESSOR MEDCRAFT.

The fundamental methods of analytical geometry; the straight line and circle; the properties of the conic sections; problems in loci; graphical solutions of equations. Prescribed for all freshmen in engineering courses.

4 hrs., and a 2-hr. laboratory period, second semester, M W TH F, 9, T, 8-10. 5 units.

3. Differential Calculus. PROFESSOR BLAKE.

The fundamental principles and formulae of the differential calculus, with their applications. Prescribed for sophomores in all engineering courses.

3 hrs., first semester, M W F, 9. 3 units.

4. Integral Calculus. PROFESSOR BLAKE.

The fundamental principles and formulae of integral calculus, with their applications. Prerequisite, Mathematics 3. Prescribed for sophomores in all engineering courses.

3 hrs., second semester, M W F, 9. 3 units.

5, 6. Analytical Mechanics. PROFESSOR BLAKE.

The mathematical treatment of the fundamental principles of dynamics and statics. illustrated and applied. Prerequisites, Mathematics 4, and Physics 1, 2.

4 hrs., and a 2-hr. laboratory period, first semester, and 4 hrs., second semester, M T W TH, 10. 9 units.

MECHANIC ARTS

PROFESSOR HENLEY, MR. TARR.

The courses in Mechanic Arts comprise the elements of shop work and drawing. The work consists of lectures, recitations and drawing, tool and machine work. The courses are designed with special regard for the needs of the students in engineering, an effort being made to familiarize the student with the ordinary methods in shop work, a knowledge of which is valuable to every engineer, rather than to develop the skill of the mechanic

1. **Mechanical Drawing.**

PROFESSOR HENLEY and MR. TARR.

Elements of mechanical drawing, including lettering, tracing and blue printing. The subject is treated in a purely mechanical way, the object being to enable the student to learn to make and read ordinary working drawings, and to give him some knowledge of ordinary drafting room practice.

2 laboratory periods, first semester, T W, 1-4. 2 units.

2. **Descriptive Geometry.** PROFESSOR HENLEY.

Elements of descriptive geometry, including problems in warped surfaces and intersection of solids.

2 lecture and laboratory periods, second semester, T W, 1-4. 2 units.

3. **Wood Shop.** PROFESSOR HENLEY.

Bench and machine work; elements of pattern and foundry work. Note books required.

2 periods, first semester, M, 1 (lecture), 2-4 (shop), S, 9-12 (shop). 2 units.

4. Forge Shop. PROFESSOR HENLEY.

Forge work in iron and steel; tempering, case-hardening and annealing. A study of those characteristics of iron and steel which affect their working in the shop. Note books required.

2 periods, second semester, M, 1 (lecture), 2-4 (shop), S 9-12 (shop). 2 units.

5, 6. Machine Shop. PROFESSOR HENLEY.

This course includes the elements of machine shop practice, and the erection and care of machinery. The student is given work on the drill press, shaper, lathe, and planer, as well as at the bench and on the erecting floor. Only the ordinary classes of work are taken up, the object being to make it as much as possible, a general engineering course. Open to students who have had courses 1, 3, 4, or an equivalent.

2 periods, both semesters, TH, 1 (lecture), 2-4 (shop), F, 1-4. 4 units.

7, 8. Advanced Machine Shop Practice.

PROFESSOR HENLEY.

This course is designed for students in mechanical engineering, or others who require a more thorough course than is given in courses 1, 3, 4, 5, 6. It continues the work of these courses and in addition takes up the various standard manufacturing methods. The work consists of shop work, lectures and reading, the equivalent of two half-days a week, both semesters, the hours to be arranged with the instructor. 4 units.

MECHANICAL ENGINEERING.

PROFESSOR E. M. BLAKE.

1. Heat Engines. PROFESSOR BLAKE.

Principles of thermodynamics as applied to steam and internal combustion engines. Study of the general structural features and methods of operating the more important types of boilers, and steam and gasoline engines.

2 hrs. and a 3-hrs. laboratory period, first semester, T TH, 8, M, 1-4. 3 units.

2. Dynamo-Electric Machinery. PROFESSOR BLAKE.

Theory underlying the generation, transmission, and utilization of electric currents. Description of the more important types of generators and motors. Prerequisite, Mechanical Engineering 1.

2 hrs. and a 3-hrs. drafting period, second semester, T TH, 8, M, 1-4. 3 units.

3, 4. Kinematics of Machinery and Elements of Machine Design. PROFESSOR BLAKE.

Theory and design of linkages, gears, cams, screws, and other machine elements.

1 hr. and two 2-hrs. drafting periods, both semesters. 6 units.

5, 6. .Mechanical Laboratory. PROFESSOR BLAKE.

Operation, inspection, and testing of boilers, steam and gasoline engines, compressed air machinery and pumps.

1 hr. and two 3-hrs. laboratory periods, both semesters. 6 units.

***7, 8. Machine Design.** PROFESSOR BLAKE.

Exercises in the designing of complete machines, such as a steam or gas engine, a pump, a compressor, a mine hoist, or a locomotive.

1 hr. and one 2-hrs. drafting period, both semesters. 4 units.

***9, 10. Power Plant Design and Economics.**
PROFESSOR BLAKE.

Study of machinery installations as to arrangement of parts, adaptability to intended work, and economy of first cost and operation. Exercises in writing specifications and designs of such installations as the boiler plant and engines of an electric generating station, a pumping station for a water works, an air compressing plant for a mine, or a stamp mill. As part of this course trips will be made to the mining districts of Arizona and Sonora, usually one or two weeks in March or April.

1 hr. and two 2-hrs. drafting periods, both semesters. 6 units.

METALLURGY.

PROFESSOR GOODRICH.

1. Introduction to Metallurgy. PROFESSOR GOODRICH.

Physical properties of metals, alloys, thermal treatment of metals, thermal measurements, fuel, refractory materials, metallurgical processes, furnaces, thermochemistry, metallurgy of iron and steel. Seniors in

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*Omitted 1908–9.

Mining Engineering and Metallurgy. Lectures and recitations.

4 hrs. for 1 month, first semester, 1 unit.

2. Fire Assaying. PROFESSOR GOODRICH.

Fire assay for gold, silver and lead. Bullion assays. Prerequisite, Chemistry 3, 4.

15 hrs., or an equivalent, second semester (March, April, and May). 2 units.

3. Metallurgy of Gold and Silver.

PROFESSOR GOODRICH.

Stamp milling, chlorination, cyaniding, pan-amalgamation; Patio, Cazo, Fondon, Krohnke, and Tina processes, hyposulphite leaching practice, etc. Lectures and recitations. Prerequisite, Metallurgy 1, 2.

4 hrs., first semester (except first month), T, 4, W F, F 8 3 units.

4. Metallurgy of Lead and Copper.

PROFESSOR GOODRICH.

Sampling, receiving, purchasing, roasting; blast furnace methods, reverberatory furnace methods; pyritic smelting, converting, desilveration of base bullion, electrolytic refining, hydro-metallurgy of copper, etc. Lectures and recitations. Prerequisites, Metallurgy 1, 2, and 3.

4 hrs., second semester, T, 4, W F, 1 F 8. 4 units.

5A. Metallurgical Laboratory. PROFESSOR GOODRICH.

Amalgamation, cyaniding, chlorination, hypo-suphite lixiviation, etc., tests, together with mill work.

This course runs parallel with Metallurgy 3. Lectures.
One weekly period, first semester. 1 unit.

5B. Metallurgical Laboratory.

Sampling, concentration, mill work. This course runs parallel with Metallurgy 7. Lectures.

One weekly perion, first semester. 1 unit.

6. Advanced Metallurgical Laboratory.

PROFESSOR GOODRICH.

This course is a continuation of Metallurgy 5 (mill work), for such students as have completed Metallurgy 5, and who desire more practical experience in ore testing. New machinery is being constantly added to the mill, which becomes available for this course.

2 periods, second semester. 2 units.

7. Ore Dressing. PROFESSOR GOODRICH.

Breaking, crushing, separating, concentrating, sampling; mill processes and management. Lectures and recitations.Prerequisites, Chemistry 3, 4, and Metallurgy 2.

3 hrs., first semester, M W F, 11. 3 units.

***8. Metallurgy of Rare Metals.** PROFESSOR GOODRICH.

Metallurgy of zinc, cadmium, nickel, mercury, bismuth, tin, antimony, cobalt, platinum, tungsten, molybdenum, Lectures and recitations. Prerequisites, Metallurgy 1, 2, and 3.

2 hrs., second semester. 2 units.

9. Excursions. See Mining Engineering 7, 8.

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*Omitted 1908–1909.

MINING ENGINEERING.

PROFESSOR TOLMAN, MR. TARR.

In this course attention is largely directed to the economics of mining, and the laboratory and drafting work is so arranged that the student will have plans and designs which will be of value in the practice of the profession.

1, 2. Lectures on Mining.

PROFESSOR TOLMAN and MR. TARR.

Locations of claims; mining laws of the important mining countries of the world; prospecting; excavations, tunnels, shafts, and methods of timbering; underhand, overhand, square sett, filling and caving methods of mining; pumping; ventilation; transportation; hoisting; mining machinery, its installation; and surface improvements of mines.

Methods for undeveloped properties compared with those for developed mines. Mine accounts, cost sheets, stope sheets, assay plans; methods of management, mine sampling and mine reporting.

2 hrs., both semesters (1909-1910). 4 units.

3, 4. Laboratory in Mining.

PROFFESSOR TOLMAN and MR. TARR.

The study and designing of timbering, and mining constructions of all kinds, ore bins, head gear, pumping devices, etc.

One 3-hrs. laboratory period, both semesters. 2 units.

5, 6. Technical Mining Literature.

PROFESSOR TOLMAN and MR. TARR.

The summarizing of the current literature on mining, and arrangement of a card index of the same.

One 3-hrs. laboratory period, both semesters, 2 units.

7. Practical Mining.

Before entering upon the work of the Senior year, all students who are candidates for the degree of B. S. in Mining must have spent at least four weeks in practical underground mining, or for the degree of B. S. in Metallurgy four weeks in a metallurgical plant, or in underground mining, preferably the former. The fulfillment of this requirement must be evidenced by the certificate of the mine superintendent or foreman, and by notes and sketches of the processes observed, to be presented to the faculty of the School of Mines, and discussed with them.

In connection with the courses in mining engineering and metallurgy, trips will be made to mining districts in Arizona and Sonora, usually one or two weeks in March or April. These trips are required of all candidates for the degree of B. S. in Mining Engineering and Metallurgy.

The purpose of these trips is to afford the student an opportunity for close study and inspection of mining and metallurgical plants, and of rock formations and of minerals of commercial value. The students are accompanied by members of the faculty, and every effort is made to make the trips of the greatest practical value. The visits are carefully scheduled and notes, with sketches, measurements and photographs are taken, and elaborated into comprehensive reports by each student after the return.

During April, 1909, the mining district of Silverbell and the metallurgical plant at Sasco were visited in this way. The thanks of the University are due the superintendents of the various plants visited, for their efforts and care in acquainting the students with the work under their management.

PHILOSOPHY AND EDUCATION.

MRS. STANLEY.

1, 2. History of Philosophy. MRS. STANLEY.

A study of the basal concepts and fundamental problems of philosophical thought as developed historically. Lectures, recitations and assigned reading. Textbook, Schwegler's *History of Philosophy.*

3 hrs., both semesters, M W F, 9. 6 units.

***3. Psychology.** MRS. STANLEY.

A special consideration of the subject as applied to teaching. Lectures, recitations and collateral reading. Open to Juniors and Seniors.

2 hrs., both semesters. 4 units.

4. Pedagogy. MRS. STANLEY.

An account of educational evolution, both as a culture fact in the history of civilization and as a foundation for professional work; lectures, giving a brief but comprehensive outline of school systems, a special study of leading educators such as Comenius, Pestalozzi, Froebel, Mann, and others; methods of teaching, school manage ment and school law. Arrangements have been made with the Tucson city schools to provide practice work for this class. Open to students who have taken Philosophy 1.

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*Omitted 1908-09.

2 hrs., both semesters, M W, 10. 4 units.

***5. Logic.** MRS. STANLEY.

Textbook, Jevons' *Logic;* reading from Mill, Hamilton, Thompson and others. Open to Juniors and Seniors.

4 hrs., first semester. 4 units.

***6. Ethics.** MRS. STANLEY.

Theoretical and practical ethics; view of the historical development of the science; origin and development of the moral consciousness; application of the principles of ethics to the problems of life. Lectures, discussions and assigned reading. Open to Juniors and Seniors.

3 hrs., second semester. 3 units.

7. Philosophical Problems in Great Books.

MRS. STANLEY.

A comparative study of interpretations of life as revealed in masterpieces of the world's literature.

This course is designed to meet the needs of students who cannot afford the time for advanced English or philosophy, as well as to supplement the course now offered in those departments. The programme as planned will include ten great books, viz.: *The Antigone of Sophocles; The Apology of Socrates*; Plato's *Republic; The Book of Job;* Dante's *Divine Comedy; Les Miserables; Faust;* Tolstoi's *Anna Karenina;* Ibsen's *Peer Gynt.*

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*Omitted 1908–09.

Lectures and interpretative readings. Open as free elective to all Juniors and Seniors.

1 hr. both semesters, F, 8. 2 units.

PHYSICAL TRAINING.

MR. KLEEBERGER, MISS MERRIMAN.

The department of physical training has general direction of the gymnastic and athletic activities of the University. The department aims to give the students such exercises, games, and sports as will best create and maintain a vigorous physical health, and to this end it strives to reach as many persons as possible, especially the weak and undeveloped, and to give to each one exercise that will at once benefit, interest, and stimulate. Physical training is prescribed for all freshmen and sophomores from October 1st to May 15th. With the approval of the director of the gymnasium, students may substitute some form of regular athletic work for the course in the gymnasium for specified periods.

A. Physical Examinations for Men. MR. KLEEBERGER

The examination includes about thirty measurements of the body, tests of strength, and examination of the heart, lungs and other vital organs, together with inspection for marks of vaccination and physical inequalities. Prescribed for all freshmen and sophomores at the beginning of the year, or upon entrance into these classes. A second examination is optional with the instructor, while a rigid and complete special examination by the University physician may be ordered at any time.

1, 2. Gymnastics and Hygiene for Men.

MR. KLEEBERGER.

Setting up exercises, calisthenic drills, indoor games, and simple apparatus work. Lectures on the physiology of exercise, personal hygiene, and corrective exercises. Required of all freshmen unless excused on recommendation of the University physician.

2 half-hour periods, both semesters. 1-2 unit.

3, 4. Advanced Gymnastics. MR. KLEEBERGER.

A continuation of the work of the first year; the use of apparatus, parallel bars, horizontal bar, horses, rings; out-door runs, etc. When possible the class will be divided into graded sections for special work on the apparatus. Required of all sophomores unexcused by the University physician.

2 half-hour periods, both semesters. 1-2 unit.

5, 6, 7, 8. Gymnastics for Women.

MR. KLEEBERGER AND MISS MERRIMAN.

The work is prescribed for young women as for men, and resembles that for men in its general scope and aim. It is, however, modified to suit the needs of the young women, emphasis being laid upon poise, carriage, grace, and development. Music is used for class drills, marching, and dancing. A gymnasium suit is necessary, consisting of a loose blouse waist, divided skirt, and the regular gymnasium shoes. The waist has a sailor collar trimmed with white braid. Four yards of double width, 54-inch dark blue serge is required, if Butterick patterns are used; ready-made suits may be purchased for about $4 at the gymnasium. Required of freshman and sophomore years.

3 hrs., each semester, 2 units.

B. Football, Baseball, Basketball, Tennis, and Field and Track Work.

Recreative sports as a relaxation from study and as a means of development are recognized by the University in its provisions of fields, courts, etc., and by its acceptance of time devoted to such sports, with the approval of the director of the gymnasium, as satisfaction for part of the requirements in Physical Training. Save for the traditional seasons fixed for these sports by climatic conditions in other regions, they might all be indulged in throughout nearly the whole academic year, as is the case with tennis. The direct control and management of these sports and of the competitive games with outside teams, are vested in the Athletic Association of the University of Arizona, made up of both students and faculty, but officered by students. During the current year, contests have been held with the Univesrity of New Mexico, at Albuquerque, New Mexico, in football; with the Tempe Normal School, in Tempe and in Tucson, in baseball and tennis; with the Phoenix High School, in Phoenix and Tucson, in baseball; with the Bisbee High School, in basketball; and with the Tucson High School in baseball and basketball.

MINERALOGY.

PROFESSOR GUILD (ABSENT ON LEAVE, 1908-9,) PROFESSOR TOLMAN (IN CHARGE, 1908-9) MR. TARR.

The main object of the courses in mineralogy is to familiarize the student with facts and methods that will enable him to determine the character of an ore or mineral by observation of its physical properties and by the performance of a few simple tests with the blowpipe, since in the field and mine recourse cannot usually be had to a well equipped chemical laboratory.

1, 2. **General Mineralogy.** PROF. TOLMAN, MR. TARR.

Lectures and recitations in crystallography and the classification and uses of minerals; laboratory work in blow-pipe analysis and determinative mineralogy; the study of a type collection of 600 minerals arranged and classified according to Dana. Text-books: Dana, *Text-book of Mineralogy*, and Brush, *Manual of Determinative Mineralogy and Blow-pipe Analysis.* Prerequisites: Chemistry 2 and Physics 2.

2 hrs., and two 3-hr. laboratory (blow-pipe) periods, first semester. 4 units (crystallography 2, blow-pipe 2). 3 hrs., or equivalent, second semester, 3 units.

3. **Advanced Crystallography.** PROFESSOR TOLMAN.

With microscopic study of the rock-forming minerals. Prerequisites: Geology 2 and Mineralogy 2.

2 hrs., or an equivalent, first semester. 2 units.

4. **Petrography.** PROFESSOR TOLMAN.

The preparation of thin sections of rocks for microscopic study, rock analysis, and the study of a type selection of rocks. Prerequisite, Mineralogy 3.

2 hrs., or an equivalent, second semester. 2 units.

PHYSICS.

PROFESSOR DOUGLASS.

The object of this course is to acquaint the student with the fundamental physical principles which underlie the higher courses of chemistry, mechanics and engineering. Note books are required in all courses.

1, 2. General Physics. PROFESSOR DOUGLAS.

Lectures, recitations and laboratory work. First semester: mechanics and heat. Second semester: Electricity, wave motion, sound and light. The laboratory experiments give prominence to general electrical measurement, but include the study of wave motions and their application so the other subjects. Prerequisites: a course in elementary physics and mathematics 1.

2 hrs., and two 2-hr. periods in the laboratory, both semesters, M W F, 11-12, T TH, 10-12. 8 units.

3. Thermodynamics and Heat. PROF: DOUGLASS.

A study of the foundation principles underlying mechanical engineering, latent and specific heats, ocnductivity, expansion, mechanical equivalent, high temperatures, cycles, entropy, properties of steam, etc. Prescrideb for third year in mechanical engineering course.

1 hr. and two 2-hr. periods, first semester. 3 units.

4. Electrical and Optical Measurements.' PROF. DOUGLASS.

A study of the electrical machines and instruments used in mechanical engineering, and of the optical instruments handled in mining and civil engineering courses. Prescribed for the third year in mechanical and civil engineering courses. Two 3-hr. periods, second semester. 4 units.

SOCIOLOGY.

ASSISTANT PROFESSOR CHANDLER.

***1. Introduction to the Study of Sociology.**

ASSISTANT PROFESSOR CHANDLER.

A study of the underlying principles of social organization. A sketch of the development of the science up to date. The application of social principles to problems of contemporary society.

3 hrs., first semester. 3 units.

***2. Socialism and Social Reform.**

ASSISTANT PROFESSOR CHANDLER.

History of the rise and development of modern socialism. The progress of socialism with industrial revolution will be closely followed. A review will be made of the different French, German and English schools and of the present status of socialism as a political and practical reform movement in Europe and America.

3 hrs., second semester. 3 units.

†3. Social Problems of Today.

ASSISTANT PROFESSOR CHANDLER.

This course will deal with the most important problems which confront English and American societies, such as those attending the rapid development of cities and congested industrial centers, the slum, tenement house, child labor, the sweat shop, the liquor problem, race suicide, and increase of divorce. Some time will be devoted to practical reforms now being tested, such as industrial education, factory legislation, juvenile courts, University settlements, etc.

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*Omitted, 1908-1909.

†Offered in 1910-11 and alternate years.

2 hrs., first semester. 2 units.

SPANISH.

PROFESSOR TURRELL, MISS ALDRICH.

1, 2. Elementary Spanish. MISS ALDRICH.

First semester: Hills and Ford, *Spanish Grammar*, Turrell, *Spanish Reader*, begun. Conversation and oral work. Second semester: grammar and reader completed; additional readings with composition and dictation.

5 hrs., both semesters. I, M T W TH F, 9; II, M T W TH F, 11:30. 8 units.

3, 4. Advanced Spanish. PROFESSOR TURRELL.

First semester: Reading of Johnson, *Cuentos Modernos*, Alarcon, *El Capitan Veneno*. Second semester: Galdós, *Marianela*, Valdes, *La Alegria del Capitan Ribot*, etc. Three hours each week during the first semester and two hours during the second will be given to composition, letter-writing and syntax, using Umphrey, *Spanish Composition* and Bonilla, *Spanish Daily Life*.

5 hrs., both semesters, M T W TH F, 1. 8 units.

5. Spanish Literature to the Nineteenth Century.
PROFESSOR TURRELL.

Lectures in Spanish on the early literature of Spain, the "Siglo de Oro," etc., with library readings. Class study of Cervantes, *Don Quijote* (Selections), Lope de Vega, *La Estrella de Sevilla*, Calderón, *La Vida es Sueno*, etc.

3 hrs., first semester, M W F, 9. 3 units.

6. Spanish Literature in the Nineteenth Century.
PROFESSOR TURRELL.

Particular study of the drama. Reading of Moratín, *El Si de las Ninas*, Larra, *Partir a Tiempo*, Gutiérrez, *El Trovador*, Tomayo y Baus, *Lo Positivo*, Nunez de Arce, *El Haz de Lena*, Echegaray, *El Gran Galeoto*, Galdós, *Electra*.

3 hrs., second semester, M W F, 9. 3 units.

***7. General Survey of the Literature of the Countries of Spanish America.** PROFESSOR TURRELL.

Class reading of Ugarte, *La Joven Literatura Hispano-americana*, Hills, *Bardos Cubanos*, Avellaneda, *Baltasar*, etc.

2 hrs., first semester, T TH, 9. 2 units.

***8. History of Mexican Literature.**
PROFESSOR TURRELL.

Reading of works by the best authors, as included in the *Biblioteca de Autores Mexicanos*, etc.

2 hrs., second semester, T TH, 9. 2 units.

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*Omitted 1909–10.

***9, 10. Advanced Spanish Composition and Commercial Spanish.** PROFESSOR TURRELL.

A practical course in writing and speaking Spanish. Harrison, *Spanish Correspondence*, Remy, *Spanish Composition*, etc. will be used. Original essays, letters and reports in Spanish. (May be taken with courses 5, 6, but must be preceded by courses 1,2, 3, 4.)

2 hrs., both semesters. 4 units.

***To be given in 1909–10.**

SHORT COURSE IN AGRICULTURE.

This course is offered, first, to meet the demands of prospective homeseekers who desire to learn something about the general principles and practices of irrigation farming before engaging in actual farm operations in Arizona. Second, to give the young man who feels that he cannot afford the time or the means to pursue a full college course a brief introduction to some of the most important scientific principles and facts that are the basis of successful farming, before he settles down to his chosen business, as well as to give him a measure of that broad general culture that is always incidental to University life, and which makes so much for good citizenship. Third, to equip young men to take advantage of opportunities and to fill positions demanding more intelligence and skill than ordinary farm labor. Opportunities and positions for young men of such training are now open in Arizona and will become more frequent as the great reclamation projects being carried on are completed. As specific examples may be mentioned: First, the employment at present by the U. S. Reclamation Service and private ditch companies of many ditch superintendents, all of whom need special training for the work. These positions are constantly changing personnel and the number of such men so employed will more than double within the next two years. The positions pay from $75 to $135 per month. Second, there are vast areas of desert land in Arizona that may be reclaimed by pumping, and the opportunities for development of this kind of irrigation farming have scarcely been touched; but to make the most of such opportunities one will need more mechanical skill and more knowledge of the physical properties of soil than the average farmer possesses. Courses in Irrigation Engineering, Farm Management, Soil Physics, Vegetable Bardening, Orchard Management, and Farm Dairying, are especially designed to equip young men to take advantage of these opportunities and positions.

ADMISSION.

Students will be admitted to the short course who have a general knowledge of the common school branches and sufficient maturity in years to understand the value of their time and opportunity. They will be accorded the same privileges, and required to observe the same regulations, as other students registered in the University and resident upon the campus.

EQUIPMENT.

The University is amply equipped with library, laboratory, and green-house facilities, while the development of a farm of 80 acres recently purchased will give opportunity for an abundance of practice in the application of the knowledge gained in the class room, library, laboratory and green houses.

The following outline of the course of study indicates the scope of the work done. In addition to the time spent in the class room indicated below, students will be required to make at least two afternoons per week on the farm, for which they will be paid by the University.

I YEAR.

FIRST SEMESTER.		SECOND SEMESTER.	
Breeds of Farm Animals	3	Breeds of Farm Animals	2
Plant Culture and Orchard Management	5	Farm Management	3
		Gardening	3
Algebra	5	Algebra	5
English	5	English	5
Drawing and Shop	5	Drawing and Shop	5

II YEAR.

Feeds and Feeding	3	Soils	5
Dairying	5	Veterinary Science	5
Poultry	3	Principles of Breeding	5
Irrigation Engineering	5	Market Classes of Farm Animals	2
Chemistry	5	Chemistry	5

BUREAU OF MINES AND ASSAYING.

A separate department of the School of Mines under the name of "The Bureau of Mines and Assaying" has been established to receive and work ores, and to make assays and analyses of ores, minerals, mineral waters and petroleum.

In accordance with the act of the Legislature of the Territory, approved March, 1897, and amended in March, 1899, assays of ores and minerals are made for the prospectors and miners of Arizona and for others at fixed rates established by the law, and tabulated below. To meet the requirements of this work a special laboratory building of brick has been erected and maintained.

Extreme accuracy and excellence of work are considered of more importance than pecuniary profits. All assays are made in duplicate and if not accordant are repeated. The work of the Bureau is under the personal direction of the professor of metallurgy and a paid assistant, and the assays are not made by students, who receive their instruction in the regular laboratories of the University.

The money received for assaying is deposited monthly to the credit of the assay fund which is used to pay the assayer and the cost of material and apparatus.

RATES FOR ASSAYING AND CHEMICAL DETERMINATIONS.

COMMON ASSAYS AND CHEMICAL DETERMINATIONS.

One element only:	
Gold, or silver, or copper, or lead, or iron, or insoluble	$1.00
Zinc, or calcium, or magnesium, or sulphur, or manganese	1.50
Silicon or chlorine	2.00
Combinations:	
Gold and silver	1.00
Copper and iron, or lead and iron	1.50
Insoluble, copper, and lead	2.00
Insoluble, copper, and iron	2.00
Insoluble, lead and iron	2.00
Insoluble, zinc, and iron	2.50
Insoluble, lead, copper, and iron	2.50
Gold, silver, copper, and lead	2.50
Gold, silver, copper, iron, and insoluble	2.50

SPECIAL CHEMICAL DETERMINATIONS.

One element only:	
Aluminum, or tungsten, or barium, or chromium	3.00
Cadmium, or tin, or arsenic, or bismuth or antimony, or titanium, or sodium, or potassium, or uranium, or phosphorus	4.00
Nickel, or cobalt, or molybdenum, or vanadium	5.00

CHEMICAL ANALYSIS.

Coal and coke analysis, giving moisture, volatile combustible matter, fixed carbon and ash	5.00
The same, including determination of sulphur and phosphorus	7.50
Silicate analysis	15.00
Cement analysis (chemical)	15.00
Cement analysis (mechanical)	2.50
Cement tests (strength and soundness, by the Department of Civil Engineering)	3.00
Boiler water analysis	10.00

RATES FOR TESTING ORES.

Stamp Mill Amalgamation, including sampling, assays, retorting, etc.:

For lots of one ton or thereabouts	$30.00
The same, with concentration of pulp on Wilfley table	30.00
For lots of two tons, without concentration	40.00
For lots of two tons, with concentration	45.00

Smaller Amalgamation Tests, including all sampling charges, and concentration after amalgamation:

For small samples up to five pounds	$ 7.00
For small samples, five to twenty-five pounds	10.00
For small samples, twenty to one hundred pounds	15.00

In these smaller tests, the sample is ground to pass a suitable mesh, and is agitated with mercury. The mercury is panned out, retorted, and the values determined in bullion. The values in the concentrates and tailings are also determined. The number of tests necessary to determine the adaptability of any ore to treatment in cyaniding varies so greatly that no general rates can be offered.

CONSIGNMENTS, REMITTANCES, ETC.

Samples, ores, and other consignments should be shipped to the University of Arizona, the School of Mines, Tucson, Arizona. Small quantities may best be sent by mail, at the rate of one cent per ounce; larger quantities by express or by freight. The Wells Fargo Express Company makes daily deliveries at the University.

All assays, chemical determinations and chemical analyses, except gratuitous qualitative tests mentioned elsewhere, must be paid for in advance.

No determination of any kind will be made until the required payment arrives. Remittances should be made by postoffice money order, Wells Fargo money order, bank draft, or check on a Tucson bank, payable to K. C. Babcock, President, University of Arizona, to whom also business communications relating to matters discussed in this circular should be addressed.

AGRICULTURAL EXPERIMENT STATION.

OFFICERS.

KENDRIC C. BABCOCK, Ph. D.. President of the University.
ROBERT H. FORBES, M. S., Director and Chemist.
JOHN J. THORNBER, A. M., Botanist.
ALBERT E. VINSON, Ph. D., Biochemist.
FREDERICK W. WILSON, B. S., Animal Husbandman.
G. E. P. SMITH, C. E., Irrigation Engineer.
WILLIAM B. MCCALLUM, Ph. D., Associate Botanist.
J. ELIOT COIT, Ph. D., Horticulturist.
WILLIAM H. ROSS, Ph. D., Assistant Chemist.
ROBERT W. CLOTHIER, M. S., Agriculturist.
FRANK C. KELTON, B. S., Assistant Engineer.
T. D. A. COCKRELL, Consulting Entomologist.
WILBUR O. HAYES, Secretary.

ORGANIZATION AND WORK.

The Agricultural Experiment Station is a legally constituted department of the University, whose purpose is to "aid in acquiring and diffusing * * * useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and applications of agricultural science."

With the above objects in view, the organization of the station includes the departments of administration, agriculture, horticulture, animal husbandry, botany, plant physiology and pathology, chemistry, and irrigation investigations, the whole or a major portion of the time of one or more members of the station staff being devoted to each department of the station work. Provision is made for meterological work also, though to a less degree.

Owing to the wide variation in agricultural conditions in Arizona, it has been found of advantage to distribute the work so that each department is located, so far as possible, in that region most favorable to the accomplishment of its own special results. According to this principle, the various lines of Experiment Statlon work have been distributed as follows:

The Director's office and the departments of botany, plant physiology and pathology, chemistry, and irrigation investigations are maintained at Tucson in the University buildings. Through this arrangement the Experiment Station profits by the buildings and libraries of the University, while the University is benefitted from time to time by the teaching ability of members of the Station staff. It has been found that from this base of operations the three great agricultural districts of the Territory—Salt River Valley, the lower Colorado, and the upper Gila—are accessible with equal convenience for field work and observations.

On the same ground—fitness of location for the work undertaken—the Experiment Station Farm has been maintained and strengthened at Phoenix. Salt

River valley is intermediate in elevation, in situation, and in mean yearly temperature between the other two important farming districts above mentioned, and for this reason the agricultural and horticultural results obtained there are capable of the most general application in the Territory at large.

On the same principle again, the date palm orchard, conducted in co-operation with the United States Department of Agriculture, is located in the alkaline district south of Tempe, where a successful demonstration of this palm as a commercial fruit producer will be of the greatest value, creating use for great areas of alkaline land in the arid southwest.

The demonstration farm near Yuma, in the fertile Colorado Valley bottom, has likewise afforded a succession of object lessons to the public of that locality, as well as much needed information concerning crops, agricultural methods and markets for that rich region.

The range station also, for the study of worn-out range country with a view to its reclamation to usefulness, is located in a typical district near Tucson, and is conducted under the auspices of the department of botany, co-operating with the United States Department of Agriculture.

A dry-farm has recently been put in operation in the Sulphur Springs Valley, between Willcox and Douglas, in a locality typical of large areas.

The results of the Experiment Station work are made public at frequent intervals in the bulletins and reports of the Station. These publications are made in two series: First, the longer and more technical bulletins, stating in considerable detail the investigations as they mature; and, secondly, the Timely Hints for Farmers, which are brief writings issued at the time when they will be most useful, written in plain language, and presented in popular form.

Along its several general lines of effort the Station during the ten years ending with 1908 has issued 99 publications, exclusive of annual reports which contain much technical information of similar character. These publications may be classified as follows:

Soils, waters, alkali, and farm management	21
Climate	1
Crops	35
Weeds, insect pests and plant diseases	15
Irrigation	10
Animal industry and the range	17

When it is remembered that for years past the mailing list has enabled us to reach from forty to fifty per cent of the farming population of the Territory, it is not surprising that the effects of Station work are now generally in evidence, more particularly in our irrigated southern valleys.

Continuing with former appropriations the Twenty-Fifth Territorial Legislature set aside $13,100 for the use of the Experiment Station for the bienium ending in 1911. This appropriation provides for printing, for Farmers' Instiutes, for dry-farming experiments, for the maintenance of the date orchard at Tempe and the demonstration farm at Yuma. Supplementing the Federal funds therefore, provision is made for the symmetrical development of this work in the Territory, both experimentally and educationally; and, prospectively, "the farmers' college" bids fair to increase in usefulness to the growing agricultural interests of the Territory.

PREPARATORY DEPARTMENT.

FACULTY.

KENDRIC CHARLES BABCOCK, Ph. D., President.
HENRY A. E. CHANDLER, B. S., Principal.

CHARLES ALFRED TURRELL, A. M., French, German, Spanish.
WILLIAM WHEELER HENLEY, A. B., Shopwork and Drawing.
ANDREW ELLICOTT DOUGLAS, D. Sc., Science.
CAPT. HIRAM M. POWELL, Military Science and Tactics.
WILLIAM GEORGE MEDCRAFT, A. M., Mathematics.
RAYMOND C. BENNER, M. S., Chemistry.
HENRY A. E. CHANDLER, B. S., History and Civics.
LEVONA PAYNE NEWSOM, Ph. D., Latin and Greek.
FRANK LEWIS KLEEBERGER, B. S., Physical Training and Mathematics.
FREDERICK E. TALMAGE, B. L., Bookkeeping, Stenography, Typewriting.
*OPAL I. TILLMAN, B. S., Domestic Science and Botany.
IDA C. REID, Ph. B., Mathematics and History..
HELEN JANE ALDRICH, M. A., Spanish and French.
CAROLINE BATES SINGLETON, A. B., English.
ETHELBERT W. WALDRON, A. B., English.
WILLIAM ARTHUR TARR, B. S., Drawing.
ELIZABETH ELLINWOOD ROBERTS, A. B., German.
MABEL A. GUILD, Latin.

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*Resigned, March, 1909.

GENERAL INFORMATION.

In this department the University offers the work of a well-organized, four-years high school, with the added advantages of shopwork and drawing, and military drill. The general library and gymnasium are open to all students in this department.

The equipment of the scientific laboratories is available for use in this preparatory work, whenever it can be used advantageously, and makes possible strong work in elementary science. The instructors in this department are assisted by the professors of the college departments, several of whom regularly conduct preparatory classes. By reference to the course of study which follows, it will be seen that it offers a comprehensive training for those who may not be able to pursue their studies farther, while it gives a good preparation for college.

ADMISSION.

Admission to regular standing in the first year of the preparatory course presupposes the completion of the work of the eighth grade of the public or parochial schools. Students who do not bring certificates showing the completion of this work,must take examinations to test their ability to pursue profitably the work of the first year. Pupils who have not completed the work of the ninth grade (or the first year of a high school) will not be admitted into the University from cities in Arizona having more than 5,000 population.

All students entering the preparatory department will be required to take an examination in oral reading. To remedy notable deficiency in this subject, the University will require extra work in addition to other studies. In all cases in which the preparation of a student in a particular subject proves to be deficient, the University reserves the right to require the student to secure at his own expense the help of an approved coach until the deficiency is remedied.

LIVING ACCOMODATIONS AND EXPENSES.

One dormitory, South Hall, is set apart for the use of male preparatory students; details of furnishings, living expenses, etc., are set forth in a paragraph earlier in this Register. These expenses are substantially the same for both college and preparatory students, save that laboratory fees and book bills are higher for the former. The expenses necessarily incurred during the academic year are about $250, but of this amount nearly one-third falls due in the first month, or in the six weeks before Novemebr 1st, in the form of charges which are made but once during the year or but once during the stay of the student in the University. The following are the ordinary expenses for the first month:

Matriculation	$ 5.00
Dormitory deposit—Maintenance fee	3.00
Mattress, blankets, pillows, sheets, etc., (unless brought from home by the student)	15.00
Board for the first month, including napkin fee.	17.50
Books	6.00

Shop and Drawing fee	5.00
Military uniform	16.25
	$67.75

The dormitory is placed in charge of two resident instructors, assisted by a committee of students. Inspection of rooms is made in the morning and in the evening by the head of the dormitory. The hours from seven to quarter past nine in the evening are observed as study hours except on Fridays and Sundays. Students under twenty-one years of age are required, unless relieved by the President, to obtain permission to leave the Campus, or to leave the dormitory during study hours, except on Sundays from nine to twelve A. M., Wednesdays, four to seven P. M., and Fridays, four to six P. M. Breaches of the regulations of the dormitory are punished by "extra study"—labor about the buildings or grounds—by confinement to rooms, or by expulsion from the dormitory; for damage to University property, a money penalty is imposed.

COURSE OF STUDY.

The following course of study will be required of all students who fit themselves at the University for entrance to the Freshman class in 1910. Such variations from it will be permitted as will adapt it to the case of students who took part of their work in other schools.

Military drill is required of all able-bodied male students throughout the course. Physical training is required of all students, unless they are excused by the

President upon presenting a certificate from one of the University physicians. The young men have drill three times per week and exercise in the gymnasium twice. The young women have physical culture three times a week.

The language begun in the second or third year must be pursued for at least two years in order to secure credit towards graduation.

Though the subjects are for convenience grouped by years in the following schedule, the departmental method is followed. In the description of courses, the subjects are arranged by groups or departments in the consecutive order in which they are taken up and students will be required to take them in this order. Aside from this sequence the ability of each student must determine what subjects will be pursued at any given time, due regard being given to the proper balance of subjects. The wishes of parents will always be given careful consideration in making up the schedule of work for each student, but the final decision in the matter rests with the committee on registration, which is composed of persons who have had long experience in secondary and collegiate teaching. Individual attention will be given to the needs of each student.

To each student who completes the studies of this course, receiving a total of sixteen units (a unit representing a subject pursued for one year with five, or four, recitation periods per week), a certificate stating that fact will be given, entitling the holder to admission to the corresponding University courses of instruction without examination.

Subjects thus marked * are elective. Five hours of elective must be chosen in the second year. In the third and in the fourth year, electives making up at least nine hours must be chosen. The figures indicate exercises per week.

FIRST YEAR.

English	5	Drawing and shop work, or Agriculture	5
Algebra	5		
Greek and Roman History	3		
Physical Geography	3		

SECOND YEAR.

English	5	*Latin (first year)	5
Algebra	5	*German (first year)	5
European History	5	*French (first year)	5
*Botany	5	*Spanish (first year)	5
*Agriculture	5	*Drawing and shop work	5
*Bookkeeping	5		

THIRD YEAR.

English	5	*French (second year)	5
Plane Geometry	5	*German (first year)	5
*Chemistry	5	*German (second year)	5
*Latin (second year)	5	*Spanish (first year)	5
*Greek (first year)	5	*Spanish (second year)	5
*French (first year)	5	*Stenography	5

FOURTH YEAR.

English	5	*Latin (third year)	4
American History and Civics	5	*Greek (second year)	5
*Solid Geometry (first half)	4	*French (second year)	5
*Trigonometry (second half)	5	*German (second year)	5
*Physics	5	*Spanish (second year)	5

ENGLISH.

The English of the preparatory course is based upon what is known as the entrance requirements of New England colleges. The work is in general divided into three parts: classics, studied in class; composition and grammar work done partly in class and partly outside; and supplementary reading done largely outside the class room. All these parts of the work may be carried on at the same time, as the circumstances of the class seem to require, the classics and supplementary reading forming the basis of a large part of the work in grammar and composition. Throughout the course, however, a primary aim is to develop the student's individual power of expressing himself in words. The time allotted to these three phases of English varies from year to year, increasing attention being paid to the appreciative and critical faculty as the course advances. In the fourth year a brief outling history of English literature occupies about one-half of the year's work in English.

Five hours each week throughout the course are given to English. According to the following general outline, selections from the list below are made at the discretion of the teacher, preference being given to the New England College Entrance Requirements, which are marked by an asterisk.*

FIRST YEAR.

ENGLISH GRAMMAR AND COMPOSITION receive one-half of the time of the first year. Maxwell's *Advanced Lessons in English Grammar* is used as a text-book.

CLASSICS. Shakespeare's **Merchant of Venice*, Scott's *Marmion*, Irving's **Sketchbook*, Longfellow's *Hiawatha*, Franklin's *Autobiography*, Burrough's *Sharp Eyes*.

SUPPLEMENATRY READING. Longfellow's *Evangeline*, Scott's **Ivanhoe* and *The Talisman*, Cooper's *Last of the Mohicans*, Hale's *Man Without a Country*, Mark Twain's *Tom Sawyer*, Jack London's *Call of the Wild*, Well's *War of the Worlds*.

SECOND YEAR.

COMPOSITION AND GRAMMAR. As in the first year, with attention to figures of speech, reproducing the work of classic authors, elementary etymology, exercises in composition, narration, and description.

CLASSICS. Coleridge's **Ancient Mariner;* Poe's **Poems and Tales;* Hawthorne's **House of the Seven Gables;* Tennyson's **Idylls of the King;* Lowell's *Vision *of Sir Launfal;* George Eliot's **Silas Marner*.

SUPPLEMENTARY READING. Scott's *Lady of the Lake;* Blackmore's *Lorna Doone;* Irving's **Alhambra;*

Kingsley's *Westward Ho;* Dicken's *Oliver Twist;* Bret Harte's *Luck of Roaring Camp;* Stevenson's *Treasure Island.*

THIRD YEAR.

COMPOSITION AND RHETORIC. Continued, with emphasis on elementary exposition and argumentation. Herrick and Damon's *Composition and Rhetoric* is used as a text-book.

CLASSICS. Shakespeare's **Julius Cæsar* and *Midsummer Night's Dream;* **Sir Roger de Coverley Papers;* Macaulay's *Essays on Addison* and **Johnson;* Goldsmith's *Vicar of Wakefield;* Carlyle's **Essay on Burns;* the Poems of Burns; Burke's **Speech on Conciliation.*

SUPPLEMENTARY READING. Moore's *Lalla Rookh;* Irving's *Life of Goldsmith;* Austen's *Pride and Prejudiec;* Dicken's *Tale of Two Cities;* George Eliot's *Mill on the Floss;* Barrie's *Sentimental Tommy.*

FOURTH YEAR.

COMPOSITION AND GRAMMAR. Exercises in narration and description for flexibility and ease of expression and general preparation for college entrance requirements

HISTORY OF ENGLISH LITERATURE. Study of Moody and Lovett's *First View of English Literature,* as a text-book, and reading of the following masterpieces: Chaucer's **Prologue to the Canterbury Tales;* Shakespeare's **Macbeth* and **Henry V.;* the shorter poems of *Milton, Wordsworth, *Byron, Shelley, Keats, Tennyson, and *Browning; Scott's *Pirate;* Dicken's *David Copperfield;* George Eliot's *Adam Bede.*

MATHEMATICS.

ALGEBRA. First year: introduction, factoring, fractions, simple equations. simultaneous equations, and special problems. Second year: involution, evolution, theory of exponents, radicals, quadratic equations, and proportion. The ground covered by these two years will be required for entrance to the engineering courses in college.

PLANE GEOMETRY. Third year: emphasis is laid on thorough work in original exercises.

SOLID GEOMETRY. First semester, fourth year, with original exercises.

PLANE AND SPHERICAL TRIGONOMETRY. Second semester, fourth year.

MECHANIC ARTS.

This work consists of both drawing and shop work, between which subjects the student's time is about equally divided. The course covers two years and is designed to furnish a thorough elementary knowledge of manual training as taught in the secondary schools of the country.

DRAWING. First year: Freehand sketching in perspective and orthographic projection. Reinhart's lettering, freehand working drawings. Second year: Mechanical Drawing and geometrical problems.

SHOP WORK. First year: "Sloyd," care and use of woodworking tools. Second year: Forging, joinery, wood-turning.

SCIENCE.

It is the object of the courses in science to initiate the student into the processes and methods used in laboratory work; to teach close observation, careful manipulation and logical deduction; to acquaint the student with the fundamental facts of the various branches of science and to give full practice in the use of good English in describing various observations and experiments. To insure better results in the notebooks, they will all be passed upon by one of the instructors in English.

BOTANY.

A year's work is offered in beginning botany, being largely with living plants. Simple and compound microscopes are provided, and students are required to keep careful notes on laboratory work and experiments. The work is supplemented with lectures and a text-book.

PHYSICAL GEOGRAPHY.

This course, combining the laboratory method with the text-book, aims to give the pupils training in exact observation of familiar phenomena, like distance, weight, pressure of liquids and gases, temperature, winds, clouds and the habits of plants and animals. The natural forces producing erosion, formation of soil, and rocks, the processes of nature as seen in seed germination and plant growth (with demonstrations with the microscope) will be discussed, with frequent experiments and field excursions. The entire country within the reach of the University is a great natural laboratory, full of interest and information for all. The course explains these features which become so familiar to everyone residing here.

CHEMISTRY.

A year's work with the text and in the laboratory, in such proportions as the instructor decides upon. Each student must keep a notebook in which he describes the process and results of his laboratory work.

PHYSICS.

The course aims to show that physics is not something abstract or mysterious, but is the simple explanation of everyday occurrences not usually understood and often unnoticed. It consists of three recitation periods and four laboratory periods per week, carried on along the lines laid down for the senior year in secondary schools. Each student must keep a notebook in which a minimum number of experiments must be written up.

HISTORY.

The aim of the work in history is to lead the pupil to see the development of races and nations along political, social and religious lines, and to arouse in him a love for the subject and a habit of broad and discriminating reading.

The work of the first year consists of a survey of the development and characteristics of the Greek and Roman civilizations. A text such as Wolfson's *Essentials of Ancient History*, or West's *Ancient History*, will be supplemented by collateral reading and a notebook.

The work of the second year includes mediaeval and modern history. The aim is to give the student an idea of the essential unity of history and the leading facts in the political development of races and nations. Harding's *Essentials of Mediaeval and Modern History*, is is used, supplemented by the reading of references.

Hart's *Actual Government* is the textbook in civics. The historical development of the subject is made prominent, while practical problems, such as taxation and municipal government, are made the subjects of special investigation and study. The text in history will be Channing's *Students' History of the United States*.

LATIN, GREEK, FRENCH, GERMAN AND SPANISH.

For an outline of the courses in Latin and Greek see page 48, under requirements for admission.

For an outline of the courses in French, Spanish and German, see pages 80, 104, 84.

BOOKKEEPING AND COMMERCIAL PRACTICE.

Bookkeeping is taught by the modern budget system. The work is individual and each student may progress as fast as his time and ability permit. The course if thorough in all the details of office practice. Students are made familiar with different filing cabinets, the filing of letters, the use of card ledgers, the copying and indexing of letters and bills in copy books. The course includes instruction in commercial law, with special emphasis laid on the ordinary forms of commercial paper and the different endorsements. The department is equipped with the latest vertical files, cabinets, letter press and office sundries. All students in bookkeeping are required to take some other branch of mathematics and must show proficiency in English.

STENOGRAPHY AND TYPEWRITING.

A complete course in stenography is offered. The Gallagher-Marsh system, a system which has received the highest endorsement of leading court reporters on the Pacific Coast, and which has been adopted by the Boards of Education in the largest cities of California, has recently been adopted. The amount of time allotted for this work has also been increased from five hours to eight hours per week. The object of the course is to train students so that they may become practical stenographers. With this end in view particular stress is laid upon neatness, filing, copying and indexing. This branch of the commercial department is equipped with up-to-date filing cases, office sundries, and six typewriters, four of which are Remingtons, one an Oliver, and one the L. C. Smith Visible. Five of the typewriters are new. *Students taking this work are required to have had one year of high school English, and to take English with this course.*

ALUMNI REGISTER.

The Alumni Association of the University of Arizona organized on the second day of June, 1897, represents the body of graduates of the University; its object, as expressed in its constitution, is "To promote the interests of the University, to secure unity among its graduates and to foster an attachment to our Alma Mater."

1895.

*Charles Oma Rouse, B. S.

Mercedes Anna Shibell, B. S., (Mrs. A. J. Gould), Tucson.

Mary Flint Walker, B. S., (Mrs. Pearl Adams), Benson.

1897.

Edward Marshall Boggs, C. E., (nunc pro tunc), Chief Engineer Oakland Electric Railways, Oakland, California.

Clara Cramond Fish, B. S., (Mrs. F. C. Roberts), Mammoth.

George Ojeda Hilzinger, B. S., Attorney, Tucson.

Mark Walker, B. S., Metallurgist, Los Angeles, California.

1898.

Hattie Ferrin, B. S., (Mrs. Charles Solomon). Safford.

Granville Malcolm Gillett, B. S., Draughtsman in Surveyor General's Office, Phoenix.

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*Died, 1906.

Minnie Watts, B. S., (Mrs. W. B. Smith), Altaville, California.

*John Desha Young, B. S.

1899.

Robert L. Morton, B. S., Assayer, Yuma.

1900.

Ida Clarissa Flood, B. S., (Mrs. G. Dodge), Oakland, California.

Samuel Pressly McCrea, B. S., A. B., Principal of High School, Redwood City, California.

Charles Pierce Richmond, B. S., Mining Engineer, Phoenix.

Florence Russell Welles, B. S., (Mrs. Wm. Angus), Los Angeles, California.

1901.

Rudolph Castaneda, B. S., Engineer, Nacozari, Sonora, Mexico.

Clara Ferrin, B. S., Teacher, Tucson.

George Millard Parker, B. S., Denver, Colorado.

David Hull Holmes, B. S., (nunc pro tunc), Architect, Tucson.

1902.

Andrew Gilbert Aiken, A. B., B. S., Surveyor, Canton, New York.

Moses Blumenkranz, B. S., Assistant Superintendent Shannon Copper Company, Metcalf.

Ruth Brown, Ph. B., (Mrs. Wilkins Manning), Tucson.

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*Died, 1899.

Felix Grundy Haynes, B. S., Casa Grande.

Rose Belle Parrott, Ph. B., Teacher, Roseburg, Oregon.

Philip Matthew Reilly, B. S., Mining Superintendent Cumpas, Sonora, Mexico.

Bertram L. Smith, B. S., Assayer, Silver Bell.

Bessie Smith, Ph. B., (Mrs. Earle Davis), Douglas.

Walter James Wakefield, Cashier, B. S., Tucson.

1903.

Advanced Degrees:

LL. D., Hon. William Herring, Tucson.

M A., John William Gorby, (B. A., Marietta), Chicago, Illinois.

M. A., Benjamin Franklin Stacey, (B. A., B. D., Lombard), Teacher, Pasadena, California.

Richard Lamar Drane, B. S., Asst. Chief Engineer Randolph Lines, Tucson.

George Mark Evans, (LL. B., Michigan), Ph. B., Teacher, Santa Ana, California.

Leslie Alexander Gillett, B. S., (Mining), Draughtsman, Surveyor General's Office, Phoenix.

Georgia Ann Holmesley, Ph. B., Teacher, Clifton.

Edward Horton Jones, B. S., Assayer, Denver, Colorado.

John Williard Prout, Jr., B. S., General Manager Santa Cruz M. and S. Co., Mowry.

Thomas Edward Steele, B. S., Assayer, Sasco.

1904.

William Burnham Alexander, B. S., Civil Engineer, Tucson.

Elbert John Hollingshead [Kimble], B. S., Clerk, Seattle, Washington.

Frank Caleb Kelton, B. S., Assistant Engineer, University of Arizona, Tucson.

Estella Markham Prout, Ph. B., Teacher, Mowry.

John Willard Prout, Jr., B. S. (Mining), See 1903.

1905.

*Ora Elinor Norway, Ph. B.

1906.

Advanced Degree:

M. S., William B. Begg, (A. B., Toronto).

Chester Bennett Clegg, B. S., (Civil Engineering).

John Wesley Gebb, B. S. (Mining), Dawson, Alaska.

Roy Bartley Kilgore, B. S. (Mining), Seattle, Washington.

Roy Gibbons Mead, B. S. (Mining), Mine Superintendent, Camptonville, California.

Roy Webb Moore, B. S. (Mining), Kelvin.

Carobel Murphey, (A. B., Cox College), Ph. B., Teacher, Tucson.

Ida Christina Reid, Ph. B., Instructor, University of Arizona, Tucson.

Minnie Louise Wooddell, Ph. B., Teacher, Tucson.

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*Died, 1908.

1907.

Advanced Degree:

Engineer of Mines, John Willard Prout, B. S., B. S. (Mining). See 1903.

Charles Alexander, Ph. B., Tempe.

Harriet Estella Brown, Ph. B., Teacher, Tucson.

Lawrence Brodhead Croasdale, B. S. (Mechanical Engineering), Draughtsman, Delaware Water Gap, Pa.

Weda Ina Purcell, Ph. B., Teacher, Tucson.

Hugh Maupin Wolflin, B. S., U. S. Testing Engineer, Pittsburg, Pa.

1908.

Honorary Degree:

LL. D., William Phipps Blake, Sc. D., Tucson.

Carroll Pitkin Bradstreet, B. S., Pachuca, Mexico.

Benjamin Scott Dinsmore, B. S., Kennecott, Alaska.

William Arthur Tarr, B. S. (Mech. Eng.) Oklahoma (Agricultural),B. S. (Mining), Instructor, University of Arizona, Tucson.

Hugh Maupin Wolflin, B.S., B.S. (Mining). See 1907

Leigh Ernest Worthing, B. S., Traver, Michigan.

MILITARY ORGANIZATION.

APRIL 1, 1909.

Commandant of Cadets

CAPTAIN HIRAM McL. POWELL, U. S. A.

Assistant to Commandant.

CAPTAIN WARREN A. GROSSETTA, N. G. A.

Captain	Rollin Brown
First Lieutenant	Charles A. Firth
Second Lieutenant	Sidney R. Jones
First Sergeant	J. Urbano Salazar
Sergeant (color)	John C. McClure
Sergeant (color)	George Nishihara
Sergeant	William R. Campbell
Sergeant	Clifton H. Rolfe
Corporal	Leo Z. Rick
Corporal	Arthur L. Lovejoy
Corporal	Stadden S. Hart
Corporal	Ralph S. Rigg
Corporal	Ralph W. Harrison
Corporal	Erving A. Johnson
Corporal (Trumpeter)	Carlos Castaneda

REGISTER OF STUDENTS.

GRADUATES.

Bates, Florence Fisher, A. B. Michigan; A. M. Columbia	Tucson
Bonillas, Ygnacio Safford, B. S. Mass. Inst. Tech.	Nogales, Sonora
Carpenter, Miles Miller, B. S. Texas (Agric.)	Tucson
Comstock, Elizabeth M., A. B. Indiana	Richmond, Indiana
Kleeberger, Frank Lewis, B. S. California	Tucson
Maynard, Arthur Bennett, A. B. Hamilton	Fundicion, Sonora
Reid, Ida Christina, Ph. B. Arizona	Tucson
Singleton, Caroline Bates, A. B. Wellesley	Tucson
Schurtz, Vera Zoe, A. B. Michigan	Tucson
Tarr, William Arthur, B. S. Oklahoma (Agric.), B. S. (Mining) Arizona	Tucson

SENIORS.

Hatcher, Burrell R.	Douglas
Hooper, Ethel Amis	Berkeley, California
La Baree, Grace Ysabel	Tucson
Post, Anita Calneh	Tucson
Ruthrauff, John Mosheim	Tucson
Thompson, Arthur Perry	Phoenix
Wilkerson, Mabel	San Bernardino, California

JUNIORS.

Behr, Ernest Edward	Pasadena, California
Blades, Ernest Orrin	Roosevelt
Burnham, Roderick Deane	Pasadena, California
Calloway, Lawrence Arthur	Tucson
Disney, Lester	Lawrence, Kansas
Doan, Fletcher Morris, Jr.	Tombstone
Douglass, Ida Whittington	Tucson
Grossetta, Warren Arthur	Tucson
Hoyt, Joseph Clyde	Jerome
Rebstock, Duane	Los Angeles, California

SOPHOMORES.

Adams, Leland Drew	Oakland, California
Andrus, Dexter Eli	Rockford, Illionis
Elliott, Ruth (special)	Clifton
Farish, Thomas Edward (special)	Phoenix
Foster, George S., Jr. (special)	Tucson
Harriman, William Ruddy	Los Angeles, California
Harrison, Ralph Waldo	Ashland, Wisconsin
Kitt, Katherine F.	Tucson
Millar, Leslie Creighton	Tucson
Murphey, Elizabeth Ella	Tucson
Plunkett, Ralph Elbert (special)	Little Rock, Arkansas
Purcell, Ivy Mae	Tucson
Rider, Jane Herbst	Tucson
Rose, Frank Winfred	Livingston
Steele, Willard Penn	Marshfield, Ohio
Strong, Leon Henri	Tucson
Tarr, Carolynn	Tucson

FRESHMEN.

Bayard, Helen	St. Paul, Minnesota
Beck, Charlotte Ellen	Tucson
Bennie, Florence Mary	Clifton
Bone, James Lee	Phoenix
Brown, Rollin	Tucson
Coles, Henry Oliver	Bisbee
Durley, Earle Preston	Bisbee
Elliott, Gordon	Clifton
Estill, Howard Wilmot	Tucson
Firth, Charles Abraham	Aravaipa
Johnston, Clifford F.	Tempe
Lusk, Harry Wilton	Decatur, Michigan
McDermott, Ora Martina	Tucson
McNeil, Clara May	Tucson
Maverick, Philip Augustus	San Antonio, Texas
Mitten, James Ralph	Worthington, Indinan

Nishihara, George . . . . Tucson
Purcell, Marie Ella . . . . Tucson
Rice, Thomas Briggs . . . . Douglas
Rick, Leo Zeno . . . . Tucson
Roberson, George B . . . . Santa Monica, California
Sine, Janet Volume . . . . Tucson
Soulé, Madeleine . . . . Tucson
Whitwell, Sturges Bigelow . . . . Tucson
Wilkey, Leslie Guy . . . . Phoenix
Williamson, William Ray . . . . Los Angeles, California

UNCLASSED—COLLEGE.

Bates, Frances Barton—Spanish, French . . . . . Chicago, Illinois
Bogan, Phoebe—Philosophy, English, Astronomy . . . . . Tucson
Brown, Clara Agnes—Spanish, Economics,Stenography . . Tucson
Cassiday, Clifford Harry—English . . . . Tucson
Corbett, Gulie—Spanish, English . . . . Tucson
DeWolf, May Elsie—English, Spanish . . . . Anna, Illinois
Emery, Fannie—Philosophy, Spanish, French . . . . Tucson
Fish, Florence—Spanish . . . . Tucson
Goldtree, Estella—English, French, Astronomy . . . . Tucson
Goodin, Frances Earle—Astronomy . . . . Tucson
Hoover, Marie P.—French, English . . . . Springfield, Ohio
Heney, Ruth—French . . . . Tucson
Hotopp,Clara Marie—English,Spanish . . Charlottesville, Virginia
Kearns, Theresa Elizabeth—Philosophy,Spanish,English . Tucson
Leslie, Beppie Lee—Spanish ,English . . . . Tucson
MacDougal, Louise Fisher—History,English,Philosophy . Tucson
Mead, Cora—Spanish, English . . . . Tucson
Merriman, Lurena—French . . . . Tucson
O'Connell, Jessie Louise—Spanish, Philosophy . . . . Tucson
Pease, Ione Gertrude—French . . . . Tucson
Trippell, Amy—English, French . . . . Tucson
Wallace, Lunah Ward—English, Botany, Philosophy . . . . Globe

SHORT COURSE IN AGRICULTURE.

Douglas, Clyde	Phoenix
Gardiner, Eugene	Thatcher
LeRoy, Vernon Hitchcock	Santa Rosa, California
Hite, Courtright	Newark, Ohio
Lee, Robert E.	Thatcher
Nichols, Isaac F.	Tucson
St. Claire, Herbert	Phoenix
Tierce, Homer Fleming	Bisbee
Wooddell, DeLeslie	Tucson

FOURTH PREPARATORY.

Baker, Mary Agnes	Tucson
Barnes, Ernest Leo	Humboldt
Bley, Florence Marion	Los Angeles, California
Brown, James Lewis	Deming, New Mexico
Brown, Marguerite	Tucson
Corda, Mamie W.	Tucson
Flanagan, James Joseph	Los Angeles, California
Jones, Ida L.	Tucson
Jones. Mary Virginia	Tucson
Jones, Sidney Raymond	Clifton
Lovejoy, Arthur L.	Tucson
McClure, John C.	Tucson
Morales, Teresa	Tucson
Smith, Charlotte Ellen	Globe
Wuerdeman, Walter H.	Tucson

THIRD PREPARATORY.

Baker, Anna Ruth	Tucson
Brown, Beryl	Tucson
Campbell, William Riggs	Tucson
Christy, Gerald F.	Tucson
Clark, Benjamin H.	Benson
Cook, Carrie H.	Tucson
Cook, Nina Reese	Tucson
Culin, Frank L., Jr.	Tucson

Grabe, Irene	**Tucson**
Hawke, Viola M.	Tucson
Huddleston, Julian	Tucson
Hofmann, Gladys B.	Tucson
Jameson, Belle	Tucson
Johnson, Erving A.	Morenci
Kavanaugh, Rose	Tucson
McReynolds, William B.	Tucson
Millar, Edward B.	Tucson
Nichols, Louise W.	Tucson
O'Connell, Mildred	Tucson
Pusch, Wilhelmina	Tucson
Rigg, Ralph	Tucson
Rogers, Frederick W.	Tucson
Rolfe, Clifton H.	Tucson
Salazar, J. Urbano	Chihuahua, Mexico
Simonds, Marie T.	Hermosillo, Mexico
Soto, Ernest S.	Willcox
Wooddell, Florence	Tucson
Yoder, Paul Allen	Williams

SECOND PREPARATORY.

Anderson, Oney	Tucson
Baffert, Filomeno	Tucson
Caruthers, Eugene	Yuma
Coyle, Francis J.	Phoenix
Farrell, Robert E.	McCabe
Gaddis, Homer B.	Kingman
Greenfield, Walter	Little Rock, Arkansas
Harlan, Walter H.	Bisbee
Hart, Stadden Stimson	Tucson
Henderson, Margaret	Tucson
Hofmeister, Irene	Tucson
Jacobs, Hannah	Tucson
James, Herbert Hanna	Avalon, Pennsylvania
Lindsley, Richard	**Tucson**

Loud, Harold L.	St. Louis, Missouri
MacDougal, Alice	Tucson
Mack, Francis C.	Tucson
Martin, Gladys Sarah	Tucson
McFarland, Robert V.	Tucson
McKinney, Rufus	Cochise
Murphey, Walter	Tucson
Newland, Joseph	Ardmore, Oklahoma
Powers, Helen R.	San Pedro, California
Pusch, Maybelle	Tucson
Rea, Helen	Tucson
Richards, David L.	Altar, Mexico
Serrano, Albert	Altar, Mexico
Udall, Gladys Madge	Tucson
Wakefield, Edith	Tucson
Willard, Chester	Cornville
Wuerdeman, Emil K.	Tucson
Wright, Lyda	Tucson

FIRST PREPARATORY.

Bennie, John Willis	Clifton
Bird, Walter Duane	Nogales
Brichta, C. Louis	Tucson
Cloud, Leo F.	Tucson
Cook, Louis Joseph	Tucson
Foreshaw, Lea	La Barranca, Mexico.
Grabe, Alice	Tucson
Hedges, Lawrence S.	Chattanooga, Tennesee
Heinrichs, L. Marcelle	Fort Huachuca
Ming, Marcus A. S.	San Carlos
Newning, Oliver Brush	Houston, Texas
Pinelli, Victor	La Colorado, Mexico
Scherrer, Harry A.	Dragoon
Shattuck, Eva J.	Tucson
Simonds, Charles F.	Hermosillo, Mexico

UNCLASSIFIED PREPARATORY.

Berger, Samuel Sholes	Vail
Boyd, Omar E.	Tucson
Burnham, Isabel	Pasadena, California
Cameron, Alice F.	Tucson
Castaneda, Carlos	Benson
Hedges, James R	Chattanooga, Tennessee
McKay, Hazel	Tucson
Pusch, Henrietta Louise	Tucson
Roletti, Albert Ralph	Tucson
Spires, Liela M.	Tucson

SUMMARY.

	male.	Female.	Total.
Graduate Students	5	5	10
Seniors	3	4	7
Juniors	9	1	10
Sophomores	11	6	17
Freshmen	18	8	26
Unclassified, College	1	21	22
Total College	47	45	92
Fourth Preparatory	7	8	15
Third Preparatory	14	14	28
Second Preparatory	21	11	32
First Preparatory	13	2	15
Unclassified, Preparatory	5	5	10
Total Preparatory	60	40	100
Short Course in Agriculture	9	..	9
Total for the University	116	85	201

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University of Arizona Record

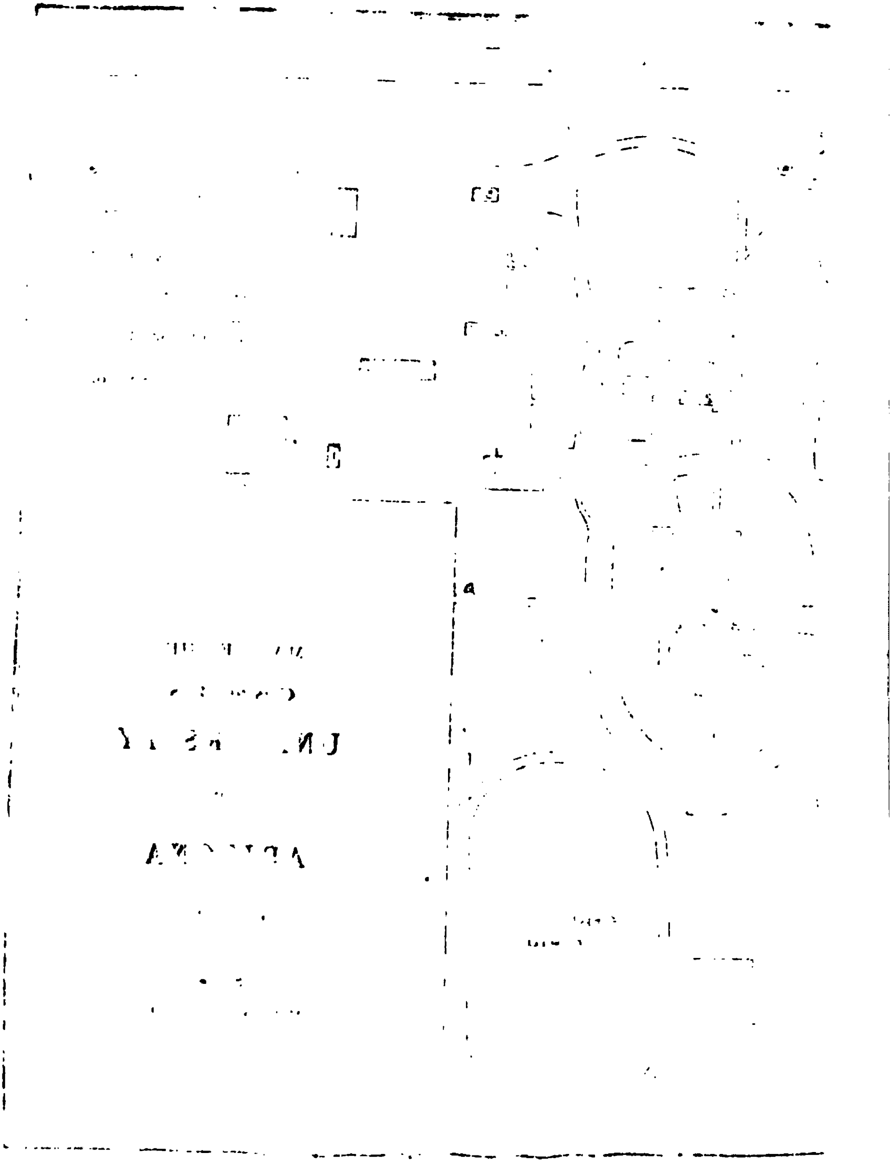
VOLUME II, NUMBER 3 MAY, 1910

REGISTER

1909-10

WITH ANNOUNCEMENTS FOR
1910-11

PUBLISHED BY THE
UNIVERSITY OF ARIZONA
TUCSON, ARIZONA



UNIVERSITY OF ARIZONA

REGISTER

1909-10

WITH ANNOUNCEMENTS FOR
1910-11

TUCSON, ARIZONA:
KIMBALL & CUTLER, PRINTERS.
1910

CALENDAR

1910.

Sept. 15, Thursday...........Entrance Examinations.
Sept. 16, Friday.............Condition Examinations.
Sept. 19, Monday.............Registration Day.
Sept. 20, Tuesday............First Semester begins.
Nov. 23, Wednesday.........Thanksgiving Recess begins.
Nov. 28, Monday.............Instruction resumed.
Dec. 23, Friday.............Holiday Recess begins.

1911.

Jan. 3, Tuesday............Instruction resumed.
Jan. 26, 27, 28,..............First Semester Examinations.
Jan. 28 Saturday...........First Semester ends.
Jan. 30, Monday............Second Semester begins.
Feb. 22, Wednesday.........Holiday.
May 28, Sunday............Baccalaureate Discourse.
May 27, 29, 31,..............Second Semester Examinations.
May 30, Tuesday............Exhibition Military Department.
June 1, Thursday..........Commencement.

BOARD OF REGENTS.

Ex-Officio.

HON. RICHARD E. SLOAN, A. B. ....Phoenix
HON. KIRKE TONNER MOORE, LL. B. ....Phoenix

Appointed by the Governor.

Term Expires.

HON. MERRILL P. FREEMAN, Tucson.......August, 1913
Chancellor and President.

HON. GEORGE J. ROSKRUGE, Tucson.......August, 1913
Secretary.

HON. CHARLES H. BAYLESS, A. M., Tucson, August, 1913
Treasurer.

HON. A. V. GROSSETTA, Tucson..............August, 1911

Regular meetings on the 10th of each month.

OFFICERS OF INSTRUCTION, INVESTIGATION AND ADMINISTRATION.*

FACULTY.

KENDRIC CHARLES BABCOCK, Ph. D.
President's House, University Campus
B. L., 1889, Minnesota; A. M., 1895, Harvard; Ph. D., 1896, Harvard.
President; Professor of History and Economics. 1903.

WILLIAM PHIPPS BLAKE, A. M., Park Ave. and Rincon Road.
Ph. B., 1852, Yale; A. M., Dartmouth; D. Sc., 1907, Pennsylvania; LL. D., 1908, Arizona.
Professor of Geology, Emeritus. 1895.

ROBERT HUMPHREY FORBES,, M. S. University Campus
B. S., 1892, M. S., 1895, Illinois.
Director and Chemist, Agricultural Experiment Station. 1894.

FRANK NELSON GUILD, M. S. Olive Road
B. S., 1894, M. S., 1903, Vermont.
Professor of Chemistry and Mineralogy. 1897.

GEORGE EDSON PHILIP SMITH, C. E. 1195 Speedway
B. S., 1897, C. E., 1899, Vermont.
Irrigation Engineer, Agricultural Experiment Station 1907.

JOHN JAMES THORNBER, A. M. Olive Road
B. S., South Dakota (Agricultural); B. S., 1897, A. M., 1901, Nebraska.
Professor of Biology; Botanist, Agricultural Experiment Station. 1901.

EDWIN MORTIMER BLAKE, Ph. D. 1245 Speedway
Engineer of Mines, 1890; Ph. D., 1893, Columbia.
Professor of Mathematics and Mechanical Engineering. 1904.

---

*Dates following titles indicate appointment to service in the University.

Cyrus Fisher Tolman, Jr., B. S. 521 E. Third St.
B. S., 1896, Chicago.
Professor of Geology and Mining Engineering. 1905.

William Wheeler Henley, A. B. First St., near Vine St.
A. B., 1905, Leland Stanford, Jr.
Professor of Mechanic Arts. 1905.

Andrew Ellicott Douglass, Sc. D., Olive Road and Speedway
A. B., 1889; Sc. D., 1908, Trinity.
Professor of Physics and Astronomy. 1906.

Albert Earle Vinson, Ph. D. 914 N. Fourth Ave.
B. S., 1901, Ohio (State); Ph. D., 1905, Goettingen.
Biochemist, Agricultural Experiment Station. 1905.

Charles Alfred Turrell, A. M. 835 Tyndall Ave.
B. S., 1896, Nebraska; A. M., 1901, Missouri.
Professor of Modern Languages. 1904.

Leslie Abram Waterbury, C. E. 327 E. Fourth St.
B. S., 1902, C. E., 1905, Illinois.
Professor of Civil Engineering. 1907.

Robert Rhea Goodrich, M. S. 645 E. Third St.
B. S., (Mining), 1885; B. S., (Mechanical Eng.), 1901; M. S., 1902, Massachusetts Institute of Technology.
Professor of Metallurgy. 1907.

Robert Waitman Clothier, M. S. 923 E. Sixth St.
B. S. 1897; M. S., 1899, Kansas (Agricultural).
Professor of Agriculture; Conductor of Farmers' Institutes. 1907.

Ernest Sutherland Bates, Ph. D. 908 Speedway
A. B., 1902, A. M., 1903, Michigan; Ph. D., 1908, Columbia.
Professor of English. 1908.

Hiram McL. Powell, 925 Tyndall Ave.
Captain, U. S. A., 1890, West Point.
Professor of Military Science and Tactics. 1909.

George Fouche Freeman, B. S. 817 E. Fifth St.
B. S., 1903, Alabama Polytechnic Institute.
Plant Breeder, Agricultural Experiment Station. 1909.

Austin Winfield Morrill, Ph. D. 235 W. Monroe St., Phoenix.
B. S., 1900, Massachussetts Agricultural College; B. S., Boston, 1900; Ph. D., 1903, Massachusetts Agricultural College.
Entomologist, Agricultural Experiment Station, and of Arizona Horticultural Commission. 1909.

Frederick W. Wilson, B.S. Experiment Station Farm, Phoenix.
B. S., 1905, Kansas (Agricultural).
Associate Animal Husbandman, Agricultural Experiment Station. 1905.

William Burnett McCallum, Ph. D. 136 Speedway
B. S. A., 1894, Toronto; Ph. D., 1904, Chicago.
Associate Botanist, Agricultural Experiment Station. 1907

William George Medcraft, A. M.
Rust Flats, First Ave. near Third St.
A. B., 1898, A. M., 1904, Kansas Wesleyan.
Assistant Professor of Mathematics. 1905.

Raymond C. Benner, Ph. D. Fourth St. and Highland Ave.
B. S., 1902, Minnesota; M. S., 1905, Ph. D., 1909 Wisconsin.
Assistant Professor of Chemistry. 1906.

Henry Alfred Ernest Chandler, B. S.
North Hall, University Campus.
B. S., 1905, Northwestern.
Assistant Professor of History and Economics. 1908.

William Horace Ross, Ph. D. 833 E. Fourth St.
B. S., 1903, M. S., 1904, Dalhousie; Ph. D., 1907, Chicago.
Assistant Chemist, Agricultural Experiment Station. 1907.

Frank Caleb Kelton, B. S. 412 E. Fourth St.
B. S., 1904, Arizona.
Assistant Engineer, Agricultural Experiment Station. 1909.

MARION CUMMINGS STANLEY, B. L. Center St. near Speedway.
B. L., 1900, California.
Instructor in Philosophy. 1902.

ESTELLE LUTRELL, A. B. Rust Flats, First Ave. near Third St.
A. B., 1896, Chicago.
Instructor in English, Librarian. 1904.

FREDERICK EDWIN TALMAGE, B. L. Olive Road.
B. L., 1903, California.
Instructor in Stenography and Bookkeeping. 1904.

LEVONA PAYNE NEWSOM, Ph. D. Fourth St. and Euclid Ave.
A. B., 1892, Ph. D., 1895, Franklin.
Instructor in Latin. 1905.

IDA CHRISTINA REID, Ph. B. 149 E. Pennington St.
Ph. B., 1906, Arizona.
Instructor in History and Mathematics. 1906.

CAROLINE BATES SINGLETON, A. B. Center St. near Speedway.
A. B., 1906, Wellesley.
Instructor in English. 1908.

ETHELBERT WEBB WALDRON, A. B. 835 Tyndall Ave.
A. B., 1905, Michigan.
Instructor in English. 1908.

HELEN JANE ALDRICH, Ph. D. 1018 Lowell Ave.
A. B., 1904, Minnesota; A. M., 1905, Ph. D., 1909, Colorado.
Instructor in Modern Languages. 1908.

FRANK LEWIS KLEEBERGER, B. S.
South Hall, University Campus.
B. S., 1908, California.

Instructor in Physical Training and Mathematics; Director of the Gymnasium. 1908.

ELIZABETH ELLINWOOD ROBERTS, A. B. 528 E. Second St.
A. B., 1906, Western Reserve.
Instructor in German. 1908.

WILLIAM LUCIUS FOWLER, B. S.
South Hall, University Campus
B. S., 1909, Missouri.
Instructor in Animal Husbandry. 1909.

JOHN ISAACSON N. Main St. and Fifth Ave.
Instructor in Shop Practice. 1909.

JAMES GREENLEAF BROWN. Olive Road.
Instructor in Botany. 1909.

*FRANCES CROWELL 522 E. Second St.
Instructor in Music. 1909.

WILLIAM JAMES GALBRAITH, JR. 725 E. Fourth St.
A. B., 1906, Leland Stanford Jr.; J. D., 1908, Chicago.
Instructor in Law.

DANIEL TREMBLY MACDOUGAL, Ph. D.
Park Ave. and Rincon Road
(Director of the Department of Botanical Research of the Carnegie Institution of Washington.
Honorary Lecturer on Heredity and Evolution.

---

*Resigned May 1, 1910.

ADMINISTRATIVE OFFICERS AND ASSISTANTS.

Frederick Edwin Talmage, B. L. Olive Road
Secretary of the University. 1904.

E. Dana Trout. 803 E. Seventh St.
Secretary of the Agricultural Experiment Station. 1909.
Miles M. Carpenter, B. S. North Hall, University Campus
Clerk in President's Office. 1907.
Herbert Brown. 220 N. Court St.
Curator of the Territorial Museum.
Lurena Merriman. West Cottage, University Campus
Preceptress of Young Women. 1907.
Arthur W. Olcott, M. D. 237 N. Main St.
Medical Examiner for Men. 1905.
Frank Lewis Kleeberger. South Hall, University Campus
Head of South Hall. 1907.
Henry Alfred Ernest Chandler, B. S.
Head of North Hall. 1909.
Walter M. Cole, University Campus
Superintendent of Grounds. 1907.

Theodore Chapin, B. S.
Assistant in Geology.
Miss Mabel A. Guild.
Assistant Librarian.
Lawrence A. Calloway.
Assistant in Chemistry
Fletcher Morris Doan, Jr.
Assistant in Metallurgy.
Leslie Creighton Miller.
Assistant in Physics.
Ernest Orrin Blades.
Assistant in Civil Engineering.
Miner Louis Hartman.
Assistant in Chemistry and Metallurgy.
Mamie W. Corda.
Assistant in Botany.

STANDING COMMITTEES.
1909-1910.

The President is ex-officio member of all committees.

Executive.

Professors Forbes, Tolman, E. M. Blake.

Registration and Classification.

Professors E. M. Blake, Waterbury, Medcraft, Chandler.

Library.

Professors E. M. Blake, Turrell, Miss Lutrell.

Public Exercises.

Professor Medcraft, Miss Lutrell.

Co-operative Association.

Mr. Talmage.

Rhodes Scholarship.

President Babcock, Professors Guild, Bates.

UNIVERSITY OF ARIZONA

Established by Act of Legislative Assembly, 1885; Open to Students, October, 1891.

PURPOSE AND ORGANIZATION.

The University of Arizona is an integral part of the system of public education established by and for the Territory, and aims, as the head of such system, to fill the same position as that occupied by the State Universities in such states as California and Wisconsin. Its general organization is in accordance with the Act of Congress of July 2, 1862, known as the Morrill Act, creating the "Land Grant Colleges." The details of its organization and government are regulated by the Act of the Legislative Assembly of the Territory of Arizona, passed in 1885, and embodied, with amendments, in the Revised Statutes of Arizona Territory, 1901, which vests the government of the institution in a corporation styled the Board of Regents of the University of Arizona, consisting of the Governor and Superintendent of Public Instruction of the Territory, ex-officio, and four other members appointed by the Governor for a term of four years.

In creating the University, the Legislative Assembly wisely followed the example of the great states of Wisconsin, Illinois, Minnesota, Nebraska, and California, in unifying under one management the various schools and institutions of higher learning or investigation in

Arizona,—the colleges of liberal arts, the schools of mining and engineering, the agricultural college, and the agricultural experiment station, which in some States have been widely and completely separated. No professional schools of law, medicine, dentistry, or music have been established. In compliance with the provisions of the Act creating it, the University consists of

I. The College of Agriculture and Mechanic Arts.
II. The School of Mines.
III. The Agricultural Experiment Station.
IV. The Preparatory Department.

The Normal Department, authorized by the statute, has not yet been organized. The Preparatory Department, which is really a first class manual training high school with a four years course, will gradually disappear as the educational system of the Territory is developed by the establishment of efficient high schools, but no date is set for abolishing even the first year of this preparatory course.

The University in all departments is open to properly qualified persons of both sexes. Through the aid received from the United States and from the Territory, it is enabled to offer its privileges to residents and non-residents, with only very moderate charges. The number of students in any one class or section of a class is kept below twenty, in order that each student may receive the individual attention of the instructors and thus gain the full advantage derivable from a small school.

The purpose of the University of Arizona is, in the language of the organic law, "to provide the inhabitants of this Territory with the means of acquiring a thorough knowledge of the various branches of literature, science, and the arts," and so far as possible a technical education adapted to the development of the peculiar resources of Arizona. In furtherance of this latter purpose, instruction is provided especially in subjects fundamental to agriculture, the mechanic arts, mining and metallurgy. The University, by the nature of its situation, frankly lays its strongest emphasis upon the course in mining engineering. It is, in reality, a great mining laboratory, surrounded as it is on all sides by great mines. Some of these mines developed on a large scale are within a few miles of the city, and the number and magnitude of such enterprises are steadily increasing. Probably no University in the United States offers such fine advantages to the students of mining engineering who desire to see the actual operation of great mines, or the development of great enterprises, while carrying on the theoretical and experimental work of the mining course.

The advantages in civil engineering are hardly less noteworthy, for Tucson is not only a division point on the main line of the Southern Pacific railroad, with large shops, roundhouses, and engineering offices, but it has the administrative and engineering headquarters for five of the subsidiary or allied lines of the Southern Pacific system in Arizona and in Sonora, Mexico, commonly known as the Randolph lines, including the great West Coast Line which will reach from Guaymas to Mazatlan and Guadalajara, in Mexico. All of these lines are undergoing extensive expansion and re-building, and so furnish excellent opportunities for observation and vacation employment for students of civil engineering.

LOCATION AND CLIMATE.

The University of Arizona is located at Tucson, a city of eighteen thousand inhabitants, on the main line of the Southern Pacific railway, 312 miles west of El Paso, Texas, and 500 miles east of Los Angeles, Cal. The city lies in a broad flat valley at an elevation of 2,400 feet above sea level and is surrounded by mountains. Its dry, mild, and equable climate has made Tucson a famous winter resort unsurpassed for healthfulness.

The winter climate is especially good; the temperature is cool and strengthening but not severe, the lowest temperature recorded during the average year being about twenty degrees above zero, Fahrenheit. Little rain falls during the winter; fogs are all but unknown; cloudy days are rare. The percentage of sunshine throughout the winter is greater than that recorded at any other place in the United Stntes. Owing to the extreme dryness of the air the highest temperatures known are less oppressive to the senses and less dangerous to the health than the summer heats of the upper Mississippi Valley states. The total amount of rainfall averages less than twelve inches.

These advantages insure to students a comfortable education and a wide range of out-door sports and recreations throughout the college year.

The University Campus, consisting of fifty-five acres, is situated upon high ground about a mile from the business center of the city with which it is connected by an excellent electric street-car line. On every side it commands a view of mountain scenery of remarkable extent and grandeur. The buildings are lighted by electricity furnished by the city plant.

An abundant supply of unusually good water for household, laboratory, and irrigation purposes is drawn from a large well on the Campus from a depth of one hundred and twenty feet, thus securing immunity from the dangers of a contaminated water supply. The Campus has a complete sewer svstem connecting all the buildings, with one exception, with the city mains at the University gate.

The Campus, carefully laid out in drives, lawns, and gardens, with a large number of palms, olive, ash, umbrella, pepper, bagota, and cottonwood trees has the air of a well kept park.

BUILDINGS.

The main building, University Hall, the oldest of the group, is 200 x 150 feet, two stories in heighth, the first of gray stone, the second of red brick. It is completely surrounded by a wide two-story veranda. The building contains recitation rooms, laboratories and apparatus rooms of various departments, an assembly room, and the office, laboratories and library of the Agricultural Experiment Station.

The Library and Museum building is a handsome structure of red brick and Bedford sandstone, with a massive tile roof. The interior finish is in natural oak and pine. The library reading room, on the second floor, is a large, well-lighted room, beautifully furnished with heavy solid oak reading tables, desks and wall cases. The stack room at the rear is fitted up with the most modern steel stacks. The Museum occupies parts of the first floor and the west half of the second floor. Fine oak and plate glass cases constitute the furnishings. The offices of the president and secretary of the University, three lecture rooms for the departments of geology, mathematics, English and history, work rooms for the library and museum, and a laboratory for the department of geology are on the first fioor.

Science Hall, a new building, of architecture harmonious with the Library, which it faces, was completed in April, 1909, at a cost of about $40,000. Further appropriation was made in March, 1909, for furnishing and equipping the building, which was thus made ready for occupancy in September, 1909. The building, 145 x 60 feet, is of three stories, the first devoted to physics, the second to chemistry and mineralogy, and the third to botany and biology. The roomy attic and a superstructure on the roof are used as an astronomical observatory. The forty rooms provided by this Science Hall give excellent accommodations in place of the crowded quarters endured by several departments in recent years in University Hall, and the removal of these departments to the new building gives the Agricultural Experiment Station much needed space for its expanding work.

North Hall, a dormitory, two stories in height, built of gray stone of fine quality, is occupied by the college men. Besides the parlor, and rooms of the instructor in charge, it contains seventeen rooms, each large enough to accommodate two students, besides bath and toilet rooms.

South Hall, a large brick building containing forty rooms, besides bath and toilet rooms and store rooms, is the dormitory mainly for preparatory students. It is heated by a hot water system. It will accommodate seventy-five students.

West Cottage, with its new four-room annex, is the dormitory for young women,—a two story brick house with wide porches, surrounded with vines, shrubbery, lawns and trees.

The Dining Hall, built of red brick, provides ample boarding accommodations for all persons living on the Campus.

The Shop and Assay building is a large, substantial brick structure. It contains a commodious drawing room for mechanical and free-hand drawing, a large laboratory for forge work, machine practice and carpentry, and a lecture room, instrument room, and material testing laboratory for the department of civil engineering. Two other rooms are used for lockers, and for the motor and engine. The assay laboratory and commercial assaying department occupy five rooms fully equipped with a large melting furnace, the necessary muffle furnaces, and other accessories for making complete and accurate assays.

The Mill or Mining Machinery building, located to the northeast of the main group of buildings, is a plain wooden structure in which are placed the stamp mills, jigs, concentrating tables, separators, etc., necessary for the mining laboratory.

Herring Hall, the gymnasium, is a very substantial high building, 40 x 80 feet, constructed of red brick and white plaster. It was erected in 1903, the gift of

Professor James Douglas and his associates of the Copper Queen Consolidated Mining Company, through Colonel William Herring, after whom it was named, at the suggestion of Professor Douglas.

The pump house and mechanical engineering laboratory was built in 1905. By the use of brick, cement and iron it is practically fire proof, thus insuring safety to the well and pumps supplying the University with water for all its uses.

Two two-story brick residences are occupied by the President of the University and by the Director of the Agricultural Experiment Station.

Other buildings are the cottage occupied by the Superintendent of Buildings and Grounds, three greenhouses, a brick barn, and various smaller outbuildings used for shops and store rooms.

MAINTENANCE.

The University is maintained by funds appropriated by the United States and by the Territory of Arizona. Fifty-seven sections of very valuable pine land in Coconino county have been set apart by the Federal government for the benefit of the University, but title and control of the land does not pass to the Board of Regents until the Territory is admitted as a State. In the meantime only a small sum is annually received from the leases of this land.

By the provisions of the Morrill Act of 1890, the University receives annually from the United States the sum of $25,000 "to be applied only to instruction in agriculture, the mechanic arts, the English language and the various branches of mathematical, physical, natural and economic science, with special reference to their applications in the industries of life, and to the facilities for such instruction." This Morrill Fund is to be ultimately duplicated by the Nelson Fund, created by the Act of March 4, 1907, which appropriated $5,000 for the year beginning July 1, 1907, and provided for an annual increase of $5,000 until the total received by each state should be $50,000 per year from the two funds. For the current year this fund amounted to $40,000. The University receives from the same source, for the support of the Agricultural Experiment Station, $15,000 yearly from the Hatch Act of 1887; the Adams Act of 1906, for the current year yields $13,000, which is to be increased annually by $2,000 until it also produces $15,000, giving the Station ultimately $30,000 per year.

The appropriations by the Territorial Legislative Assembly of 1909 were $35,500 per year, for two years, for maintenance; $13,100 for the work of the Agricultural Experiment Station for two years; and $11,500 per year for two years for improvements.

In 1909 the El Paso & Southwestern System gave the University $2,000 for the work of the Agricultural Experiment Station in carrying on experiments in dry farming in Cochise county.

The University also receives annually, from miscellaneous sources such as matriculation and tuition fees, rent of cottages, damage to University property, etc., about $1,500. The receipts for board, lights, etc., amount to about $16,000 per year.

ENDOWMENT.

By the munificence of Doctor James Douglas, of New York, the University received in June, 1908, "the sum of $10,000 * * * the annual interest or income from which is to be annually applied, devoted, expended and used by said Board of Regents, or its successors in trust, for the purchase of instruments of precision and research, or special apparatus, for scientific instruction and education in the department of mineralogy and School of Mines of the University of Arizona, * * * but no part of said fund or income is to be used or applied to the purchase of mining or metallurgical machinery or supplies for said department or for the use of the students in the chemical or metallurgical laboratories." The fund thus created has been named by the Board the Douglas Endowment Fund.

The Philo Sherman Bennett Scholarship is endowed by the gift of $500 to the University in 1905, through the agency of Mrs. William Jennings Bryan, the income to be used in aiding young women to secure an education.

LIBRARY.

The library contains 15,000 bound volumes and several thousand unbound bulletins and reports, chiefly agricultural. The accessions for the scholastic year 1909-10 were 1400 volumes, exclusive of government documents. Of these volumes a collection of complete sets of scientific and literary periodicals, to which additions are made yearly, is of special service in reference work. The library was made a regular depository of United States Government documents in 1907. These publications have been placed in a separate room where they are arranged and numbered according to the government check list. The library of the Experiment Station in University Hall contains a very complete set of Experiment Station literature, together with the card index to this material issued by the U. S. Department of Agriculture.

The books are classed by the decimal system and shelved in numerical order with a further author division according to the Cutter numbers. The catalogue is the usual dictionary card catalogue of authors, subjects and titles in one alphabetical arrangement. Printed cards from the Library of Congress are used, supplemented by typewritten cards for books reported as not in their stock. The library has been entirely re-catalogued on this plan in all subjects but one, and this is nearing completion.

The Reading Room is supplied with about 600 books of general reference which may be consulted by the students without any formality. All books with the exception of periodicals and books reserved for reference may be drawn for home use. The following current periodicals and newspapers are on file for the use of students and general readers in the Reading Room.

PERIODICAL LIST.

American Architect and Building News.
American Blacksmith,
American Chemical Journal,
American Chemical Society, Journal,
American College,
*American Economist,
American Forestry,
American Geographical Society, Bulletin,
American Historical Review,
American Institute of Mining Engineers, Transactions,
American Journal of Pharmacy,
American Journal of Science,
American Journal of Sociology,
American Machinist,
American Magazine,
American Mathematical Society, Bulletin,
American Mathematical Society, Transcations.
American Naturalist,
*American Philosophical Society Proceedings,
American Society for Testing Materials, Proceedings,

American Society of Civil Engineers, Transactions,
Annalen der Physik,
Annales des Mines,
Archiv. f. d. Studium d.neueren Sprachen.
*Arizona Mining Journal,
Association of Engineering Societies, Journal.
Astrophysical Journal,
Athenaeum,
Atlantic Monthly,
Australian Mining Standard,
Biedermann's Zentralblatt fur Agrikulturchemie,
*Bookbuyer,
Bookman,
Botanical Gazette,
Breeder's Gazette,
Breeders' Special,
*California Cultivator,
Canadian Entomologist,
Canadian Mining Journal,
*Canal Record,
Cassier's Magazine,
Cement,
Centralblatt f. Mineralogie,
Century,
Chemical, Metallurgical and Mining Society of South Africa, Journal.
Chemical News,
Chemical Society, Journal, (London),
Chemisches Centralblatt,
Collier's Weekly,
Country Life in America,
Craftsman,
Cumulative Book Index,
Current Literature,
Deutsche chemische Gesellschaft, Berichte,
Dial,
Economic Geology,
*Educational Gazette,
Educational Review,
Electrical Review,
Electrical World,
Electrochemical and Metallurgical Industry,
Engineering and Mining Journal.
Engineering Index,
Engineering Magazine,
Engineering News,
Engineering Record,
Englishe Studien,
Espana moderna, La.,
*Farmer's Voice,
Fern Bulletin,
Forum,
Franklin Institute, Journal,
Geological Magazine,
Geological Society of America, Bulletin,
Geologisches Centralblatt,
Good Housekeeping,
Graphic (London),
Harper's Monthly Magazine,
Harper's Weekly,
Havana University, Revista de la Facultad de letras y ciencias,
Illustracion espanola y americana,

Institut de France, Paris, Academie des Sciences, Comptes rendus des Seances,
International Studio,
Irrigation Age,
Journal of American Folk-lore,
Journal of Geography,
Journal of Geology,
Journal of Political Economy,
Ladies' Home Journal,
Literarisches Zentralblatt,
Literary Digest,
Living Age,
*Lowell Observatory, Bulletin,
McClure's Magazine,
Machinery,
Manual Training Magazine,
Mexican Mining Journal,
Mineral Industry,
Mines and Methods,
Mines and Minerals,
Mining and Scientific Press,
Mining Magazine (London),
*Mining Reporter,
*Mining Review,
Mining Science,
*Mining World,
Modern Language Association of America, Publications,
Modern Philology,
Monist,
Musician,
Nation,
NationalGeographicMagazine,
Nature,
Neues Jahrbuch f. Mineralogie,
Nineteenth Century and After,
North American Review,
*Our Dumb Animals,
Out West,
Outing,
Outlook,
*Pacific Miner,
Philosophical Review,
Physical Review,
Plant World,
Poet-lore,
Political Science Quarterly,
Popular Astronomy,
Popular Science Monthly,
Power,
Practical Engineer,
*Prairie Farmer,
Public Libraries,
Publishers' Weekly,
Quarterly Journal of Economics,
Queensland Government Mining Journal,
Readers' Guide to Periodical Literature.
Review of Reviews,
Revue des deux Mondes,
Saturday Review (London),
School Review,
School of Mines Quarterly,
Science,
Scientific American,
Scientific American Supplement,
Scribner's Magazine,
Societé francaise de Mineralogie, Bulletin,
Society of Chemical Industry, Journal,
South African Mining Journal,

Torrey Botanical Club, Bulletin.
*Western Chemist and Metallurgist,
World's Work,
Zeitschrift f. analytische chemie,
Zeitschrift fur anorganische chemie,
Zeitschrift fur physikalische chemie,

NEWSPAPERS ON FILE IN THE READING ROOM.

*Arizona Blade,
*Arizona Bulletin,
Arizona Daily Star,
*Arizona Gazette,
Arizona Range News,
*Arizona Silver Belt,
Arizona Weekly Journal-Miner,
Bisbee Review,
Coconino Sun,
Los Angeles Times,
*Graham County Guardian,
Mojave County Miner,
New York Evening Post (Saturday),
*Oasis,
Prescott Weekly Courier,
Southwestern Stockmen,
*Tempe News,
Tucson Citizen,
Tucson Post,
Tombstone Epitaph,
Weekly Republican.

The Carnegie Library of the City of Tucson is also open to the use of the students of the University. This library is also a depository of United States Government documents.

MUSEUM.

The Seventeenth Legislative Assembly of Arizona established a general museum at the University, to promote the collection of materials of all kinds illustrating the resources and development of Arizona, and particularly to preserve historical relics, including those pertaining to the aboriginal inhabitants. Donations of specimens and collections will be received and acknowledged with thanks, but no special provision has yet been made by the legislature for the support of this department, aside from a small appropriation for the salary of a curator.

The professors of the University have the immediate care of the collections pertaining to their respective departments. The collections now displayed at the University comprize representative series of minerals, ores and rocks of Arizona. Among these may be particularly mentioned superb specimens from the mines of the Copper Queen Mining Company at Bisbee. There are also collections of typical rocks and minerals for comparison, and many specimens of ores from different parts of the United States and from abroad. It is desired to make the collection of ores and minerals fully represent the great mineral resources of Arizona.

The Museum is indebted to Mr. Herbert Brown, curator, for a large and valuable collection of skins of the birds of Arizona, which he has deposited in the Museum, as well as for a collection of ancient aboriginal pottery and other relics. The fossil skull and teeth of an elephant, and other fragmentary remains of extinct animals, sent from Yuma by Mr. Brown, deserve special mention.

Historical records of much value are gradually accumulating as a part of this museum, and an appeal is made to old settlers and others to bear this fact in mind when making disposition of articles bearing even remote relation to the early pioneers and their history. All records and data of any nature that can be gleaned are worthy of preservation, and it is earnestly desired to have them placed at the University, where they will always be accessible for reference.

AGRICULTURE AND HORTICULTURE.

For purposes of instruction and demonstration by the department of agriculture. as distinguished from the

Agricultural Experiment Station, the University has purchased a tract of eighty acres of rich alluvial land in the Rillito valley just north of the Campus, which will take the place of the twenty-three acres leased during the past year in the Santa Cruz valley. On this tract new construction will be undertaken during the coming summer with a view to a rapid and permanent development of a varied instructional plant to meet the needs peculiar to this part of the great Southwest. In addition to the regular laboratories in physics, chemistry, etc., a special laboratory for soil physics will be fitted up in University Hall for use in the coming year. An excellent seed collection, green houses and tracts for experimentation, and a well selected agricultural library are other valuable parts of the equipment of the department. Funds have already been set aside for the purchase of live stock for the work in animal husbandry.

In addition to regular courses of instruction in agriculture and horticulture, "Timely Hints for Farmers," issued under the auspices of the Experiment Station, are of distinct educational value. Three thousand farmers of the Territory are reached more or less regularly by timely publications on subjects of vital interest. Farmers' Institutes, announcements of which are made from time to time, are supplemented by short courses in agriculture.

Small and well selected agricultural libraries of small cost have been forwarded to a considerable number who have expressed a willingness to receive them.

BIOLOGY.

The biological laboratories are located on the third floor of Science Hall, in a fine suite of eight rooms, convenient and well-lighted; the equipment is such as is required for modern instruction and research in the biological sciences. The library and apparatus are well selected and adapted to the region and the courses offered.

The collections possessed by the department form a very important part of its equipment. The herbarium consists of 12,000 sheets of mounted plants, of which number 2,500 are included in the University botanical survey herbarium. The unique flora and fauna of the mountain, mesa and lowland collecting grounds, in close proximity to the institution, offer very attractive opportunities for instruction and research especially along ecological lines. The Desert Botanical Laboratory of the Carnegie Institution supplements in most admirable fashion the facilities of the University for investigation.

In addition to the above there are fifty cases of insects, a large case of seeds, articulate and disarticulate human skeletons, plaster and papier mache models of the important structures of the human anatomy, and duplicate material for study and dissection.

CHEMISTRY.

The chemical laboratories used for instruction occupy twelve laboratories, class rooms, storerooms, etc. on the second and third floors of the new Science Hall.

The laboratory used by Freshmen for the study of general chemistry and qualitative analysis is at the east end of the second floor of Science Hall. It was newly furnished throughout during the current year, with desks, hoods, racks, etc., and piped for both water and gas. It has accommodations for forty-eight students.

The laboratory for quantitative analysis is at the west end of the second floor of Science Hall. It is thoroughly equipped for the teaching of volumetric and gasometric analysis, and metallurgical chemistry, including apparatus for the electrolytic determination of metals. The balance room contains analytical balances of the latest model so arranged as to insure a maximum of stability and accuracy.

A lecture and demonstration room fitted with sinks, cabinets, etc., completes an equipment of apparatus and collections adequate for first class instruction in both theoretical and practical chemistry.

The laboratory of physical chemistry, located on the third floor of the Science Hall, is well equipped with the following apparatus: Wanner's Optical pyrometer, Chateliers pyrometer, boiling point and freezing point apparatus, Pulfrich refractometer, large wave length spectroscope made by Adam Hilper, London, thermostats, polariscope, and apparatus for conductivity work and the determination of electromotive force.

Two small laboratories on the third floor are to be equipped for electro-analysis and advanced work in chemistry.

The laboratories of the Agricultural Experiment Station occupy four rooms on the first floor of the Main building. These are devoted to anaylytical work and chemical investigations relating to agriculture. Though not intended for the use of students they are of incidental value to the instructors and students through the investigations which are here conducted.

CIVIL ENGINEERING.

The apparatus in this department has been chosen with the view of familiarizing the student with the instruments which are used in practical civil engineering work and in the allied branches of hydraulic and mining engineering. The equipment includes surveyors' and engineers' levels; plane table; stadia, level, and transit rods; aneroid barometers; odometer; automatic water registers; hook gauges; current meters; drafting instruments; mechanical calculators; planimeter; a complete set of apparatus for testing cement; and an Olsen Universal testing machine of 100,000 pounds capacity.

GYMNASIUM.

Herring Hall, the gymnasium, is fully equipped for the purposes of the department of physical training and athletics. The apparatus is of standard make, and includes forty chestweights, dumb-bells, bar-bells, wands, Indian Clubs, Medart vaulting horse, parallel bars, horizontal bar, quarter-circle, abdominal chair, wrestling machine, finger machine, chest expander, chest developer, climbing rope, flying rings, traveling rings, striking bag and drum, jump and vaulting stands, fencing foils and masks, basket balls and goals, five large mats and a set of anthropometric apparatus.

In the basement are located ninety-six lockers, and five shower baths which are supplied with hot water from a heater with large reservoir.

The outdoor equipment consists of two baseball fields; a football field, six-lap track, and straightaway, at the rear of the gymnasium; five fine tennis courts; and a basketball court for girls.

MATHEMATICS

Models are an important aid to the study of mathematics. The collection of the department includes thread models of about forty ruled surfaces of the third, fourth and sixth orders. These illustrate the theory of surfaces and are also valuable in the study of kinematics and linkages.

The Bulletin and Transactions of the American Mathematical Society, and the Encyklopedia der Mathematischen Wissenschaften are subscribed for by the University Library.

MECHANIC ARTS.

The Shops and Drawing Rooms occupy a total floor area of about 8,000 square feet, divided into a large shop, and machinery room, with adjacent tool rooms, supply rooms and store rooms, a draughting room, model room, pattern room, lecture room, and offices.

The entire building is well ventilated and lighted, from above as well as from the sides. The drafting room is heated by steam.

The wood shop is equipped with a full assortment of hand tools, six turning lathes, a Universal woodworking machine, a Whitney dimension sawing machine, a band saw, a Universal trimmer, and a large grindstone with truing device.

The forge room contains twenty-four down-draught forges, twenty-four anvils, a combination shear and punch, a blacksmith's drill press and a full assortment of small tools and appliances. Blast is furnished by a No. 3 Sturtevant blower; the smoke and gases are removed by a 70-inch exhaust fan.

The machine shop contains one 24-inch Lodge and Shipley engine lathe with taper attachment, two 14-inch Lodge and Shipley lathes, one 14-inch Pratt and Whitney lathe with taper attachment, one 10-inch Reed speed lathe, one 16-inch Cincinnati shaper, one 24-inch by 6-foot Woodward and Powel planer, one Brown and Sharpe No. 2 Universal milling machine, one Brown and Sharpe No. 1 Universal grinder, one 24-inch Prentice Bros. drill press, one power hack saw, one drill grinder, one emery stand and one grinding attachment for lathes. A 1 1-2 ton portable crane and a 1-ton triplex chain hoist are used in handling the heavier work.

Each shop has its own tool room well arranged and supplied with small tools, gauges, measuring instruments, etc.

MECHANICAL ENGINEERING.

This department has a drafting and recitation room in the Library Building in addition to the regular drawing rooms of the department of Mechanic Arts. In this room is the catalogue file containing the trade literature of about five hundred leading manufacturers of the United States; the collection of working drawings consisting of over three hundred blue prints, and the sample collection of models, machine parts, valves, electrical fittings, insulating materials, abrasives, etc.

The mechanical and electrical laboratory, which occupies a large room adjoining the Pump House, is equipped for the study and operation of boilers, steam and gasoline engines, hydraulic and electrical machinery. Besides the machinery of the shop and mill which can be used for experimental purposes and for study of machine design, the University has a 45 h.p. tubular boiler, 35 h. p. Atlas engine, 30 h. p. Scott engine, a 10 x 7 x 10 Worthington Duplex pump, a Duplex feed pump, a Cameron pump, a 3 h. p. and a 1-2 h. p. direct current electric motor, an injector, a 500-gallon fire pump, a 40 h. p. Fairbanks-Morse gasoline engine, a 23 k. w. direct current Crocker-Wheeler generator, electrical measuirng instruments, and a steam gauge tester. A 300-gallon two-stage centrifugal pump in the University well and its electric motor serve as part of the equipment for mechanical engineering.

METALLURGY.

The Mill, or metallurgical laboratory, is equipped for use by the students of metallurgy in connection with their work in testing ores as to their adaptability for treatment by different processes both on a large and a small scale.

The chief features of the equipment are: a Blake crusher, 4 in. by 7 in.; a Dodge crusher, 4 in. by 6 in.; sampling rolls, 6 in. by 9 in.; a cone and burr sample grinder; a pebble mill with a capacity of about 15 lbs. at one charge; a laboratory lightning crusher and a disc pulverizer; a 5-stamp mill, with 800-pound stamps; a 3-stamp mill, with 250-pound stamps; inside and outside amalgamated plates for the same; a 2-ft. clean-up pan; a 1-ft. amalgamation pan, and a 9-jar revolving agitator for testing samples of a few ounces; a No. 5 Wilfley table of the latest pattern, and a Hallett hand jig; a 1 1-2 ton cyanide plant for treating sands or dry crushed ore; two 150-lb. cyanide plants for treating smaller samples; 3-ft. agitator; a 12-in., 6-chamber, flush plate and frame, washing filter press and pump for the same; a Sturtevant shaking screen; a Tullock ore feeder;

a belt and bucket elevator, sampling plates, split samplers, a shaking screen, percolators, sizing screens from 1-mesh to 200-mesh, miners' pans, bateas, retorts, etc.

The power for operating this plant is furnished by a 30 h. p. Westinghouse induction motor, type C.

The assay laboratory is equipped with assay furnaces for crucible work, for scorifying and cupeling, and for retorting mercury from amalgam, besides all needed appliances for assaying by dry and wet method including electrolysis. The laboratory also has desks and fittings for the chemical work required in the metallurgical and mineralogical investigation and analysis of ores, in mineral fertilizers, and in qualitative tests of minerals.

MILITARY.

Room O, in University Hall, is used as an armory. It is fitted up with the necessary gun racks and accessories. The equipment includes 150 old style Springfield rifles, 100 Krag cadet rifles with complete accoutrements, eight sabers and belts, musical instruments for the band, and signal flags. A large clear area south of the Library building is kept leveled and smooth for a drill ground and parade ground. At the rear of the Mill building are the targets for short range practice.

Fifteen 10 x 12 army wall tents with poles, etc., and a mess outfit, constitute the camp equipment of the department of military science and tactics for use on practice marches and annual encampments.

MINERALOGY AND PETROGRAPHY.

The laboratories for mineralogy consist of two rooms on the second floor of the Science Building, one being used for microscopic work in petrography and the other for blowpipe analysis and determinative mineralogy. The laboratory for microscopic work is equipped with seven petrographic microscopes including both American and foreign make, one Zeiss binocular for opaque work, models for illustrating axes of elasticity and spherical projection, a type set of rocks classified according to Rosenbusch's *Elemente der Gesteinlehre* with thin section corresponding, 120 oriented sections of minerals, and apparatus for photo-micrography and projection. The laboratury for blowpipe analysis is well supplied with minerals for making the necessary tests and studying the physical properties. A type set of 600 minerals classified according to Dana is included. For the study of crystallography, there is a collection of 300 pasteboard models of crystals, numerous glass and wooden models, three two-circle contact goniometers and one two-circle reflecting Goldschmidt goniometer of the most recent type, apparatus for the projection and drawing of crystals, and a model machine for cutting crystal models from plaster of Paris.

PHYSICS AND ASTRONOMY.

The department of physics occupies the entire first floor of the new Science Hall, where the facilities for the demonstration of all important phenomena are very complete. A lecture room seating forty persons is fitted with every modern convenience, such as lights, water, gas, heliostat, alternating and direct currents of great range, an opaque projection lantern, a double dissolving arc-light Ideal stereopticon, elevated seats, shutters for darkening the room, etc. Two large main laboratory rooms supply space for mechanical and electrical work, while separate special rooms are devoted to heat, sound, light, magnetism and research work. A carpenter's shop, a repair and store room, a photographic dark and enlarging room, and a constant temperature room are provided. A pendulum seismograph will be installed in the magnetic laboratory and a special space has been provided for a 55-foot Foucault pendulum and the study of falling bodies.

An eight-inch Willyoung induction coil with storage and X-ray accessories is used in the study of high-tension electricity. Through the generosity of the Honorable Mark J. Egan, of Clifton, the University added to its equipment for the study of electricity a fine imported set of miniature wireless telegraphy apparatus, capable of transmitting messages about two hundred feet. The department is also equipped with three motor generator sets, the largest having an output of 7 kilowatts, with a Leeds and Northrup potentiometer and accessories, and with very complete apparatus for showing electro-magnetic phenomena, rotary fields, stationary electric waves, etc.

The astronomical observatory is at the top of the building where a sliding roof, 12 feet square, uncovers the telescope and discloses a clear horizon in every direction. An 8-inch Clark lens and mounting, both of the first quality, loaned to the University by the Observatory of Harvard University, Cambridge, Mass., are mounted on a cement pier supported on the main walls of the building, and give perfectly steady images. This lens is most efficient in fundamental research work. The equipment also includes a four and one-quarter inch Brashear telescope, siderial and mean time clocks and pier for latitude and longitude observation.

GENERAL INFORMATION.

COLLEGE OF AGRICULTURE AND MECHANIC ARTS.

The courses offered in the College of Agriculture and the Mechanic Arts provide both a liberal training along literary and scientific lines and technical training along engineering, mechanical and agricultural lines. Great latitude of election is given in the literary and scientific courses, but the courses in engineering are more rigid in their requirements. Full details of the various courses follow. The aim in all is to combine the practical with the theoretical instruction. The needs of a young and growing commonwealth are kept in mind, and a steady attempt is made to develop the adaptability and resourcefulness so necessary to meet changing conditions.

ARIZONA SCHOOL OF MINES.

The School of Mines is designed for the education and training of young men in the arts and sciences directly involved in the industries of mining and metallurgy. Especial attention is given to the sciences of mathematics, physics, chemistry, mineralogy, geology and their applications. The Bureau of Mines and Assaying, while not directly connected with the work of instruction, affords with its laboratory and the influx of new material, a valuable object lesson to the advanced students of mining and metallurgy.

REGISTRATION.

All students are expected to register on registration day at the beginning of the year and at the beginning of the second semester, in the University office or in such rooms as may be designated on that day. Before making choice of elective subjects the student should in every case confer with the instructors concerned and with the committee on registration. All students are required to pay an annual incidental fee of $5.00 at the time of registration, and no student will be considered registered and entitled to attend classes unless this fee has been paid. After registration no change in classes can be made without the consent of the committee on registration or the President.

Students entering from other institutions should present to the committee certified copies of their records in such schools, together with certificates of graduation or of honorable dismissal. A copy of the school catalogue or course of study should be furnished with the credentials, in order to facilitate the work of the committee.

TUITION.

Tuition is free to students of Arizona. For all non-resident students, tuition is $10 for each semester. No reduction will be made for late registration or early withdrawal.

RECORDS.

The class standing of each student is determined by the instructor in charge. The method of ascertaining the student's record is left to the instructor, and his report in all cases is final. In addition to the reports at the end of each semester, which form the permanent records of each student, each instructor makes a monthly provisional report to the office on all students registered in his courses, and a card showing the standing of each student is mailed to his parents or guardian every month.

DISCIPLINE.

The disciplinary policy of the University in all its departments is based upon the assumption that the students are young gentlemen and young ladies who come to the institution with a high determination to utilize fully the opportunities offered, and with a keen sense of duty, honor and courtesy to each other and to the faculty. Formal and explicit prohibitions and rules are few, but those will be rigidly enforced, with adequate penalties, and good order and discipline will be maintained. The University is a civil rather than a military community, and such privileges as will not be abused will be allowed all classes of students. In aggravated cases, such as cheating in University work, frequenting saloons and other objectionable places, and serious breaches of peace or order, the faculty will not hesitate to proceed to the extreme measure of expulsion. In case of expulsion the student is required by regulations of the Regents and faculty to leave the campus immediately, and by Territorial statute to surrender his cadet uniform to the University. In all matters of discipline the faculty and President will strive for fairness, equity and efficacy rather than uniformity.

Students or classes desiring to make requests of the faculty should file their petition in the President's office before the hour of faculty meeting; class petitions must be presented at least two days before the time of meeting.

VACATIONS AND HOLIDAYS.

A short recess (see Calendar, page 2) is taken at Christmas time. The long summer vacation begins about June first and continues until the middle of September. The Thanksgiving recess extends from the close of the regular exercises on the Wednesday before Thanksgiving to the next Monday morning. During the spring, the cadet companies make a practice march of from three to seven days, which constitutes in reality a third vacation for the preparatory department and for freshmen. All legal holidays are observed by the cessation of ordinary University work.

Arbor day has been formally adopted by the University Regents as the regular anniversary on which to celebrate the founding of the institution, in connection with the ceremonies of tree planting.

LIVING ACCOMMODATIONS.

Provision is made so far as possible for furnishing board and rooms to students of both sexes upon the University grounds. Young men have comfortable quarters in South Hall, which can accommodate about seventy-five students, two in a room, and in North Hall (for College men only), which can accommodate thirty-five students. West Cottage, the home of the young ladies, is in charge of an experienced and capable preceptress, who has constant supervision of those rooming there.

All dormitories are lighted by electricity; South Hall is heated by a hot water system, the other dormitories being heated by stoves. Rooms contain a clothes press, and are provided with single bedsteads, table, chairs, mirror, wash bowl, pitcher, and slop jar. Students will supply their own mattresses, pillows, sheets, blankets, towels, rugs, and brooms, and such other articles as they may desire for ornamenting their rooms. They will care for their own rooms under the direction of the head of each dormitory.

The Dining Hall of the University has accommodations for one hundred students. It is under the management of a paid steward who is responsible to the President and the Board of Regents. While the charge of $18 per month for board is very low, it is the aim of the management to serve substantial, wholesome, appetizing meals. All students having rooms in the dormitories are required to take their meals at the Dining Hall. Students and members of the faculty who reside outside the dormitories, may board at the Dining Hall.

By resolution of the Board of Regents of the University, board is to be paid in advance on the twelfth of each month. If payment is not made before the fifteenth of each month, $19.00 instead of $18.00 will be charged for the month's board. Checks and postoffice or express money orders should be made payable to the President. No reduction in the bill for board will be made for a period less than one week, except by special arrangement at the office, made in advance.

FEES AND EXPENSES.

	LOW.	HIGH.
Tuition free to students from Arizona..		
Tuition, students non-residents of Arizona, each semester	$10.00	$10.00
Incidental fee, paid annually	5.00	5.00
Mining excursions for advanced students	20.00	40.00
Military uniform, cadet gray	16.25	24.00

Military uniform, kahki	7.25	10.00
Books, per annum	5.00	20.00
Board, per month	18.00	20.00
Lights per room, per month	.50	1.50
Napkins	.50	.50

LABORATORY FEES.

Assaying. See Metallurgy 2.	
Botany, 1, 2, 3, 4, each	$ 2.50
Chemistry 1, 2, each	15.00
Chemistry 3, 4, 5, 6, 7, each	15.00
Chemistry 10	5.00
Chemistry III (Preparatory year)	12.00
Civil Engineering 1, 2, (year)	3.00
Civil Engineering 3, 11, 13, 15, each	1.00
Civil Engineering 6, 7, 8, 9, 14, each	2.00
Geology 5, 6 (year)	10.00
Mechanic Arts I, II, 1, 2 (each year)	5.00
Metallurgy 2, (Assaying)	25.00
Metallurgy 5A, 5B, 6, each	6.00
Mineralogy 1, 2, (year)	15.00
Mineralogy 3, 4, (year)	5.00
Physics 1, 2, (year)	2.00
Physics IV (year)	3.00

Text-books may be obtained directly from the publishers through a book association managed on the co-operative plan under the direction of the faculty.

Members of the cadet companies will be required to provide themselves with the prescribed uniform, which will be ordered by the University. The cost of the cadet grey, woolen uniform, is $16.25. The uniform has shown better wearing qualities than a civilian suit of equal cost, and parents are urged to consider the matter of uniform when supplying their sons with clothing for the approaching University year. It may be worn on all occasions, and thus will remove the necessity for additional expenditure for outer clothing other than overcoats. When the warm weather of spring comes, the students are expected to purchase the regulation khaki uniform and campaign hat, the total expense being about $7.25.

ASSISTANCE TO STUDENTS.

The University has at present no loan funds with which to aid students who must earn their way. Various positions about the grounds, buildings and laboratories of the University, paying from $4 to $20 per month, are filled by students who must be self-supporting. The number, however, is not large, and preference is given to students from Arizona and to those who have spent time enough in the University to demonstrate that they are earnest, capable, reliable young men, likely to do this outside work and at the same time maintain a good record as students. During the academic year of 1908-9 forty-two different students were given assistance, totaling $2,700, or an average of $64.

The Philo Sherman Bennett scholarship, the income of $500, for aiding young women to secure an education, was awarded in March, 1910, by vote of the Regents and Faculty to Janet V. Sine, class of 1912, and Dona De Luce, class of 1913, the accumulated interest making two awards of $20 possible.

REQUIREMENTS FOR ADMISSION.

Applicants for admission to any department of the University will be required to furnish satisfactory evidence of good moral character, and certificate of graduation or of honorable dismissal from the schools with which they were last connected.

For admission to the Freshman class applicants must be at least sixteen years of age and must satisfy requirements in subjects sufficient to give fifteen and one-half credits as described below. A credit is understood to be the equivalent of one study pursued satisfactorily at least four times a week for one year, as ordinarily taught in high schools.

Students coming from approved high schools and preparatory schools, and presenting a detailed official statement of work completed from the principals of such schools, will be excused by the committee on registration from entrance examinations in those subjects covered by the credentials, with the exception of English composition. Other students will be required to pass the entrance examinations.

For admission to the course leading to the degree of Bachelor of Arts, the subjects and credits arsigned each are:

English	4	Latin	2
Algebra	1½	Greek, French, German or Spanish	2
Plane Geometry	1	Elective	2
History and Civics	2		
Science	1		

For admission to the course leading to the degree of Bachelor of Science, including the degrees of Bachelor of Science in Mining Engineering, Civil Engineering, Mechanical Engineering, of Metallurgy, the subjects and credits assigned each are:

English	4	Latin, French, German or Spanish	2
Mathematics	3½	Physics and Chemistry	2
History and Civics	2	Elective	2

SCOPE OF THE ADMISSION REQUIREMENTS.

ENGLISH.

ENGLISH—4 credits. (a) English classics. An acquaintance with the works named below. These works are divided into two classes, those intended for thorough study and those intended for general reading. The portion of the examination devoted to the former class will be upon subject matter, form and structure. In addition the candidate may be required to answer questions concerning the leading facts in those periods of English literary history to which the prescribed books belong. In the portion of the examination devoted to the latter class, the candidate will be required to present evidence of a general knowledge of the subject matter, and to answer simple questions on the lives of the authors. The form of the examination will usually be the writing of a paragraph or two on each of several topics, to be chosen by the candidate from a considerable number—perhaps ten or fifteen—set before him in the examination paper. (b) English Composition. The examination will take the form of a theme of five hundred words on some subject familiar to the candidate and will be a practical test of his ability to express himself in writing clearly and consecutively. No candidate will be accepted whose work is notably defective in point of neatness, spelling, punctuation, idiom, or division into paragraphs. Those found lacking in composition will be required to make good the deficiency at once in a special class organized for that purpose.

No student will be admitted without examination, except on the certificate from his former instructors that the entire requirement has been fulfilled. Substantial equivalents, properly certified, will be accepted.

For thorough study, for 1910: Shakespeare's *Macbeth*, Milton's *Lycidas*, *Comus*, *L'Allegro* and *Il Penseroso*; Burke's *Speech on Conciliation with America* or Washington's *Farewell Address* and Webster's *First Bunker Hill Oration;* Macaulay's *Life of Johnson* or Carlyle's *Essay on Burns*.

For general reading and practice, selections will be made, at the discretion of the teacher from groups I-VI of College Entrance Requirements in English for 1910-1911.

MATHEMATICS.

ALGEBRA—1 1-2 or 2 credits. The work required in algebra covers the usual fundamental subjects, and extends through quadratic equations, radicals, and proportion, as given in Wells' *Essentials of Algebra*, or Wentworth's *High School Algebra*.

PLANE GEOMETRY—1 credit. A year devoted to the subject as treated in the text-books of Wells or Wentworth, emphasizing original exercises.

SOLID GEOMETRY—1-2 credit. A half year should be given to this subject, emphasizing the geometry of the sphere and the original exercises.

TRIGONOMETRY—1-2 credit. Plane trigonometry, only, is required. The student should be familiar with the use of logarithmic and trigonometric tables.

HISTORY.

To meet the requirement in history the student will be expected to have used, in preparation for each credit, a good textbook, to have done regular reference work, and to have kept a notebook with outlines, summaries, maps, and topical notes on readings, varying in proportion, according to the advancement of the course.

ANCIENT HISTORY—to the year 800 A. D. 1 credit.

MEDIAEVAL AND MODERN HISTORY OF EUROPE—1 credit.

HISTORY OF ENGLAND—1 credit.

HISTORY AND GOVERNMENT OF THE UNITED STATES—1 credit.

LANGUAGE.

*GREEK—2 credits. As covered by Gleason and Atherton's *Beginner's Greek Book;* Xenophon's *Anabasis*, four books; Homer's *Iliad*, three books, with composition and the use of Hadley and Allen's or Goodwin's *Greek Grammar*.

*LATIN—2, 3 or 4 credits. As covered by Collar's *First Latin Book* and *Viri Romæ*, together with Allen and Greenough's *Grammar* and texts; sight reading; *Cæsar*, four books, or an equivalent; Cicero, four orations; Virgil, six books; sight reading from Nepos, Cicero and Gellius; Daniell's or Bennett's *Prose Composition*.

*GERMAN—2 credits. As covered by Bacon's *German Grammar*, with readings outlined for German 1, 2, 3, 4, or an equivalent.

*SPANISH—2 credits. As covered by Hills and Ford's *Spanish Grammar* with readings, etc., outlined for Spanish 1, 2, 3, 4, or an equivalent.

*FRENCH—2 credits. As covered by Fraser and Squair's *French Grammar* (Parts I and II) with readings, etc., outlined for French 1, 2, 3, 4, or an equivalent.

SCIENCE.

PHYSICAL GEOGRAPHY—1 credit or 1-2 credit. A year or half year of work which should include the principles of the subject, as treated in the best recent textbooks, field and laboratory study, and the interpretation and steady use of topographic and weather maps, charts, etc. This subject may be combined in half-credits with botany, zoology, or physiology, which may in their turn be offered as full credits if it is so desired.

BOTANY—1 credit or 1-2 credit. The course should cover a study of the life histories of types from the main groups of plants, and a series of simple physiological experiments. At least two-thirds of the course should consist of laboratory work.

CHEMISTRY—1 credit. A year's course of descriptive chemistry, consisting of both class-room and laboratory work, which should include the more common metals and non-metals and their compounds. A careful record of laboratory experiments should be kept.

PHYSICS—1 credit. Along with the use of one of the standard textbooks the year's course should include continuous and systematic laboratory practice, which should be recorded in a notebook.

ELECTIVES.

The electives offered for admission should be chosen from the above subjects or any other subjects ordinarily taught in high schools and accepted by reputable colleges and universities.

ADMISSION TO ADVANCED STANDING.

Students coming from other institutions of recognized standing may be admitted to classes above Freshman upon the presentation of properly authenticated certificates of work done, and when so admitted will be credited upon the records of this University with so much of such work as corresponds approximately with the courses required for the desired degree here. Certificates of record should be accompanied by statements of honorable dismissal or leave of absence, and a copy of the register or catalogue showing the content of the credits certified.

ADMISSION FROM ARIZONA NORMAL SCHOOLS.

By arrangements with the Arizona Normal School at Tempe, and the Northern Normal School at Flagstaff, students from these institutions will be received into the University without examination, and given credit for all work which is the equivalent of courses offered by the University either for admission or for a degree. Students from this University may also obtain the equivalent privilege at the Normal Schools by presenting the proper certificate of standing, signed by the President.

ADMISSION UPON CERTIFICATE.

Since the statutes of Arizona provide that the course of study in the high schools of the Territory "shall be such as, when completed, shall prepare its students for admission into the Territorial University," the University admits without examination, save in English composition, graduates of approved high schools of Arizona. Diplomas or corresponding credentials from high schools and preparatory schools in other states, accredited by the state universities of such states, will excuse from examinations in subjects covered by such credentials, save in English composition.

Accredited four-years high schools in Arizona:

Bisbee,
Clifton,
Douglas,
Mesa,
Phoenix,
Prescott,
Tucson,
Yuma.

High schools which have not in operation the full four-years course:

Globe,
Tempe,
Tombstone,
Willcox.

COURSE OF STUDY AND DEGREES.

All facilities and privileges of the Universitv are open to qualified persons of both sexes.

The University offers four-years courses of study leading to the degrees of Bachelor of Arts and Bachelor of Science, and to those degrees specialized as shown on pages 52-54. In each course the work is partly required and partly elective, as described by schedules later. Each student doing full work is required to take not less than fifteen hours of class room work per week. In laboratory work a period of from two to three hours is considered the equivalent of one recitation or lecture hour.

Persons of mature age and with sufficient preparation, who are not candidates for degrees, may be admitted to regular classes as special students, provided, however, that in all such cases they show to the satisfaction of the instructors in charge that they can take the course with profit to themselves and without detriment to the regular class. It is expected that those who desire thus to specialize in mineralogy, assaying, geology or surveying, will have had at least a high school education, or its equivalent, particularly in English, algebra, geometry, physics and chemistry.

The faculty reserves the right to omit classes in any course of instruction unless a suitable number of students register for the course.

Students who complete satisfactorily the required work, and the specified amount of elective work, as shown in the accompanying schedules, will be given the degree of Bachelor of Arts or Bachelor of Science. The special character of any course of study is indicated by adding to the degree the name of the department, as Bachelor of Science in Mining Engineering.

Military science and tactics and physical training are required during the freshman and sophomore years for all male students, and physical training for female students. If for any reason a student is excused from these exercises, an additional subject having a minimum of three recitation hours per week will be required.

Credit toward degrees is given by means of a unit system which assigns to each course of instruction offered a certain number of units of credits. A unit ordinarily represents one class-room hour per week, or its equivalent of two or three laboratory hours, for one semester. One hundred and thirty-one units, including three units in military science and tactics and physical culture, are required for obtaining a degree in any of the courses.

Any candidate for a degree may present as part fulfillment of requirements for graduation an acceptable thesis embodying the result of a special study of some subject within the range of the course pursued. The subject of the thesis must be submitted for the approval of the faculty at the opening of the senior year, and the completed thesis must be presented not later than three weeks before Commencement Day. The credit value will be determined by the faculty at the time the subject is approved.

GROUPS OF SUBJECTS.

GENERAL:
English, Philosophy, Mathematics, Military Science, Physical Training.

GROUP A:
Latin, Greek, French, German, Spanish.

GROUP B:
Economics, History, Law, Sociology.

GROUP C:
Agriculture, Astronomy, Botany, Chemistry, Geology, Mineralogy, Physics, Zoology.

GROUP D:
Civil Engineering, Mechanic Arts, Mechanical Engineering, Metallurgy, Mining Engineering.

REQUIREMENTS FOR DEGREES.

The units necessary for the different degrees are set forth in the following tabulations:

	Required	Free elective.
BACHELOR OF ARTS:		29
English	24	
Philosophy	12	
Mil. Science, Physical Training	3	
Group A	32	
Group B	15	
Group C	16	
Total, 131 units.		
BACHELOR OF SCIENCE:		44
English	8	
Mathematics	16	
Mil. Science, Physical Training	3	
Group B	4	
Group C and D	56	
Total, 131 units.		

CIVIL ENGINEERING.

(See Mining Engineering, p. 54, for First and Second Years.)

III YEAR.	UNITS	IV YEAR.	UNITS.
Math. 5, 6	9	Civ. Eng. 3, 6	4
Astron. 4	3	Civ. Eng. 7, 8	8
Mineral. 1	4	Civ. Eng. 13, 15	6
Physics 4	4	Mech. Eng. 1, 2	6
Civ. Eng. 9, 11, 14	12	Elective	6
	32		30

METALLURGY.

(See Mining Engineering, p. 54, for First and Second Years.)

III YEAR.	UNITS	IV YEAR.	UNITS.
Math. 5, 6	9	Metal. 1, 3, 4, 5, 7, 9,	13
Mineral. 1, 2	7	Min. Eng. 1, 2	4
Geol. 1, 2	8	Civ. Eng. 14	4
Chem. 5, 6	8	Geol. 3	3
		Mech. Eng. 1, 2	6
	32		30

MINING ENGINEERING.

I YEAR.	UNITS	II YEAR.	UNITS	III YEAR.	UNITS	IV YEAR.	UNITS
English 1, 2	6	Math. 3, 4	6	Math. 5, 6	9	Min.Eng.1,2,3,4,5,6,7	8
Math. 1, 2	10	Phys. 1, 2	8	Mineralogy 1, 2	7	Geol. 3, 4	6
Chem. 1, 2	8	Chem. 3, 4	6	Geology 1, 2	8	Geol. 5, 6, and Mineral. 3, 4 or Mech. Eng. 1,2, 3, 4, or Civ. Eng. 6,7, 11	12
Mech. Arts, 1, 2	4	Met. 2	2	Met. 3, 5A, or 7, 5B	4		
Mech. Arts, 3, 4	4	Mech. Arts, 5, 6	4	Civ. Eng. 14 or Geol.7 and Chem.10	4		
Mil. Sci	1	Civ. Eng. 1, 2	8				
Phys. Training	½	Mil. Sci	1				
		Phys. Training	½		32		
				Min. Eng. 8	4		
	33½		35½		36		26

MECHANICAL ENGINEERING.

I YEAR.	UNITS	II YEAR.	UNITS	III YEAR.	UNITS	IV YEAR.	UNITS
(See Mining Engineering for First year).		Math. 3, 4	6	Math. 5, 6	9	Mech. Eng. 5, 6	6
		Phys. 1, 2	8	Mech. Eng. 1, 2	6	Mech. Eng. 7, 8	4
		Mech. Arts, 5, 6	4	Civ. Eng. 5, 6	8	Mech. Eng. 9, 10	6
		Mech. Eng. 3, 4	6	Phys. 3, 4	7	Civ. Eng. 14	4
		Civ. Eng. 1, 2	8	Mech. Arts, 7, 8	4	Elective	10
		Mil. Sci	1				
		Phys. Training	½				
			33½		34		30

ADVANCED DEGREES.

Advanced degrees will be given only for work done in residence,to candidates who have received the Bachelor's degree from this institution or one of similar standing. Thirty units of such work will be required for the degrees of Master of Arts and Master of Science, together with a thesis. The courses in each case will be laid our by those in charge of the departments in which the work for the degree is to be taken, and must be approved by a committee composed of all the heads of departments.

Students who expect to make mining engineering their profession are advised to take a fifth year, or a five-years course, since the four-years course gives insufficient time for a student to master all the subjects that are essential for the practice of mining engineering.

The requirements for the degree of Engineer of Mines are as follows:

Candidate must have completed the course leading to the degree of Bachelor of Science either in Mining Engineering, or in Metallurgy, as given by the University in Arizona, or the equivalent of either of these courses of some school of recognized standing.

The fifth year's course will consist of not less than 30 units of resident work, which will include (1) all of the following courses, the equivalent of which has not been taken by the candidate.: Geology 1, 2, 3, 4, 5, 6, 7; Mineralogy 1, 2, 3, 4; Mining Engineering 1, 2, 3, 4, 5, 6, 7, 8; Metallurgy 1, 2, 3, 4, 5, 7. (2) At least 8 units of graduate work in Mineralogy, Geology, Mining Engineering or Metallurgy. (3) The remainder of the 30 units may be chosen from any of the engineering departments, but should not be of lower grade than Junior work. Six months of work underground and in smelters, with a satisfactory detailed report on the same, will be required. This work may be done during summer vacations.

COURSES OF INSTRUCTION.

Courses having odd numbers are given in the first semester; those having even numbers, in the second semester. The hours mentioned show the number of periods per week. The subjects are arranged alphabetically.

*AGRICULTURE.

PROFESSOR CLOTHIER AND MR. FOWLER.

1. Plant Culture and Orchard Management.

PROFESSOR CLOTHIER.

Elementary plant physiology, taking up the process of seed germination; the function of roots, stems, leaves, buds, flowers; the plant as affected by unfavorable environment. Plant propagation. Selection of orchard site; lifting, packing, shipping and transplanting trees and vines; cultivation, pruning, spraying, picking, packing and marketing fruits. Open also to preparatory students.

5 hrs., first semester. 4 units.

2. Home and Market Gardening. PROFESSOR CLOTHIER.

Practical and theoretical training in the general principles underlying successful intensive farming and the adaptability of Arizona for this branch of farming.

3 hrs., second semester. 2 units.

3, 4. Breeds or Farm Animals. MR. FOWLER.

The history of the origin and development of the various breeds of farm animals. Their leading characteristics. Practice in stock judging.

3 hrs., first semester; 3 hrs., second semester. 5 units.

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*These courses in Agriculture are also open to students in the Short Course in Agriculture.

5. Dairying. MR. FOWLER.

Production of sanitary milk on the farm, the management and care of a dairy herd, the composition and properties of milk, the manufacture of dairy products.

5 hrs., second semester. 4 units.

6. Farm Management. PROFESSOR CLOTHIER.

The course in farm management will deal with the laying out of ranches or farms with reference to arrangement of ditches, buildings, roadways, pumping plants; application of water—ridge culture, flooding on slopes. on dead levels; cultivation with reference to moisture, alkali, sediments, weeds, latent fertility, control of climatic conditions, management of alkali; crop production, successions and rotations, marketing of farm produce, business aspects of farming, such as shipping associations, markets, transportation, and farm bookkeeping.

2 hrs., second semester. 2 units.

***7. Irrigation Engineering.** PROFESSOR WATERBURY

Measuring and handling of ditch water, pumping plants, steam and gasoline engines, electric motors.

5 hrs., first semester. 4 units.

***8. Soils.** PROFESSOR CLOTHIER.

Origin, composition, and classification of soils; soil moisture and methods of conserving it, soil temperature and conditions influencing it, soil texture as affecting the supply of heat, moisture, and plant food; various culture methods in relation to soil texture, and plant food, surface tension, capillarity, osmosis and diffusion as affecting soil conditions; root development, mechanical analysis of soils.

5 hrs., second semester. 4 units.

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*Omitted 1909-1910.

***9. Poultry Husbandry.** MR. FOWLER.

The general care and management of poultry, production of poultry products for the market, diseases and pests, characteristics of breeds.

3 hrs., second semester. 3 units.

10. Veterinary Science. MR. FOWLER.

Animal physiology, sanitation, symptoms of common diseases and pests, and their remedies.

5 hrs., first semester. 4 units.

11. Feeds and Feeding. MR. FOWLER.

The principles of animal nutrition, composition and digestibility of various feeds, construction and use of silos, economical feeding of animals for various purposes, balanced rations.

3 hrs., second semester. 3 units.

12. Principles of Breeding. MR. FOWLER.

Principles governing breeding of plants and animals, atavism, reversion, heredity, correlation, selection, systems of breeding, Mendel's Law of Hybrids, modern practice in breeding.

5 hrs., second semester. 4 units.

ASTRONOMY.

PROFESSOR DOUGLASS.

The atmosphere of southern Arizona is perhaps the best in the United States for astronomical observation, having smaller percentage of cloud and less average wind velocity than any other locality where records have been preserved. The dry air and 2400 feet elevation give Tucson such a clear sky that faint stars may be watched till they set behind the distant horizon; the fine weather, day after day, gives opportunity for consecutiveness of observation not obtainable elsewhere; a greater portion of the year is available, with less interference from air currents.

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*Omitted 1909-1910.

The course in astronomy is arranged especially to draw attention to these advantages, and, at the same time, to give that understanding of the motions of the earth and planets which is so important in many branches of engineering. The eight-inch Harvard telescope with its Clark glass and the four and one-fourth inch Brashear telescope of the University will always be available for closer study of the heavenly bodies. Two excellent clocks with electric connections for transmitting time give opportunity for longitude, latitude and time observations. It is hoped in the coming year to install other instruments that will take advantage of the exceptionally favorable conditions so peculiar to Arizona.

1, 2. Descriptive Astronomy. PROFESSOR DOUGIASS.

The study of the sun, moon, and planets and other celestial objects, with constant views of their telescopic appearance, and discussion of the latest theories of the evolution of the universe and the condition of the planets. Non-mathematical; open to all students.

2 hrs., or an equivalent, both semesters. 4 units.

3, 4. Engineering Astronomy. PROFESSOR DOUGLASS.

Latitude, longitude, and time observations, and their reductions, with practice work; astronomical measurement; adjustment and handling of instruments. Course 4 is required of sophomores in civil engineering.

3 hrs., or an equivalent, both semesters. 3 or 6 units.

BOTANY.

PROFESSOR THORNBER, MR. BROWN.

The courses which follow, revised for 1910-1911, are calculated to articulate with the work done in biology in the average western high school.

The Desert Botanical Laboratory of the Carnegie Institution of Washington, D. C., is located on the mountain just west of Tucson. In this laboratory, the southwest with its unique and, as yet, little investigated flora, gains what is destined to be one of the important centers of active, scientific research. The research facilities of the laboratory are all that could be desired, and the investigations upon the desert flora will appeal to students of botany from all quarters. In the light of the above, the importance of the Desert Botanical Laboratory to the University of Arizona and especially to this department will be apparent.

1. **Elementary Botany.** MR. BROWN.

This course presents a general view of the four great groups of plants. It includes the morphology of types and their genetic relations. A required course for further botany. Texts: Bergen and Davis, *Principles of Botany;* Coulter, *Plant Studies.*

2 hrs. and 6 hrs. of laboratory work, first semester. T TH, 1-2; M W, 1-3, T TH, 2-3. 4 units.

2. **Plant Histology.** MR. BROWN.

Lectures on microscopy, botanical microtechnique, the use of the camera lucida, the photographic camera. In the laboratory the greater part of the semester is given over to the use of the various chemical reagents and stains in the preparation of microscope slides. This course is given for those who intend to teach botany and for those who are preparing to take advanced courses in this department. Text: Chamberlain, *Methods in Plant Histology.* Prerequisite, Botany 1

1 hr. of lecture and 7 hrs, of laboratory work, second semester. M, 1-2; M 2-3, T W TH, 1-3. 4 units.

3. Plant Physiology. MR. BROWN.

An elementary course in the life processes of plants. The laboratory work consists of an investigation of the properties of protoplasm; the relations of plants to mechanical forces; the influence of chemicals upon plants; the relation of plants to water, gravitation, light, respiration, growth, and movement. The laboratory, which is newly equipped, is situated in the center of a region most interesting to the physiologist. Text: MacDougal, *Textbook of Plant Physiology.* Prerequisite, Botany 1.

1 hr. of lecture and 7 hrs. of laboratory work, first semester. M, 1-2, M, 2-3, T W TH, 1-3. 4 units.

***4. Taxonomy.** MR. BROWN.

A course consisting of the analysis of plants in the field. During the semester several excursions will be made to the mesas, mountains and canyons. This course is intended not only for students who expect to continue the study of botany, but also for those who desire to know something of the desert flora. Text: Coulter and Nelson, *A New Manual of Rocky Mountain Botany.* Open to all college students.

1 hr. of lecture and 7 hrs. laboratory work, second semester. W, 2-3, TH, 2-4, 1-5. 4 units.

***5. Geographic Botany.** MR. BROWN.

Plant distribution over the surface of the earth together with the reasons for such distribution. The general aspect of the vegetation characteristic of the hygrophytic forest, the tropophytic forest, the sclerophyll forest, the savannah, the steppe, the desert, the tundra, etc. The student is expected to do a considerable amount of reading in addition to the class-room and field work. The lectures will frequently be illustrated. No laboratory work. Prerequisite, Botany 4.

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*Omitted 1909-10.

4 hrs., first semester; M T W TH, 4-5. 4 units.

***6. General Morphology of Algae and Fungi.** MR. BROWN.

Open to college students who have completed courses 1 and 2. Consult the instructor before registering. Prerequisites, Botany 1, 2.

Hours to be determined. 4 units.

***7. General Morphology of Bryophytes and Pteridophytes.**

4 units.

***8. General Morphology of Spermatophytes.**

4 units.

***9. The History of Botany.**

A lecture course dealing with (*a*) Early descriptive botanists. (*b*) The period of artificial systems: Caesalpino, Jung, Morison, Ray, Tournefort, Linnaeus. (*c*) The period of natural systems: Jussieu, Gartner, the De Candolle, Robert Brown, Endlicher, Lindley. (*d*) The beginning of modern botany. (*e*) Morphology: Goethe's Doctrine of Metamorphosis; Schimper and the spiral theory; Alexander Braun; Schleiden and the cell; Nageli, DeBarry, Hofmeister, Von Mohl, Treviranus, etc. (*f*) Physiology: Dutrochet, Liebig, Von Mohl, Sachs. (*g*) Phytogeography: Humboldt,

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*Offered 1910-1911.

Meyer, Unger, De Candolle, Kerner, Darwin. (*h*) Botany and botanists of today. Prequisites, Botany 1, 2, 3, 4. 4 units.

CHEMISTRY.

PROFESSOR GUILD, ASSISTANT PROFESSOR BENNER AND MR. CALLAWAY.

The instruction in chemistry has two main objects in view: first, to promote general culture; and second, to introduce students to technical work, especially in mining. The first two years' work in general chemistry, qualitative and quantitative analysis, places the student in a position to take up advantageously the study of mining, agricultural chemistry or metallurgy.

1, 2. General Chemistry and Qualitative Analysis.

PROF. GUILD, ASST. PROF. BENNER, MR. CALLAWAY.

Lectures and recitations illustrating the chemical properties of the elements and their compounds. Textbooks: Newth, *Inorganic Chemistry*, Elliot and Storer, *Qualitative Analysis*; and various reference books. Open to all students who have taken courses amounting to one year each in preparatory chemistry and physics.

2 hrs., and two 3-hr. laboratory periods, both semesters, T TH, 10, TH F, 1-4. 8 units.

3. Quantitative Analysis.

ASSISTANT PROFESSOR BENNER.

Laboratory practice, with lectures and recitations; the work will be chiefly in gravimetric methods of analysis. Open to all students who have taken Chemistry 2.

4 hrs., or an equivalent, first semester, M T W, 1-4. 4 units.

4. Volumetric Analysis.

ASSISTANT PROFESSOR BENNER.

A continuation of the work in Chemistry 3, special attention being given to the methods of assaying employed in the West.

4 hrs., or an equivalent, second semester. 2 units if discontinued March 15th; otherwise, 4 units.

5, 6. Special Quantitative Analysis.

ASSISTANT PROFESSOR BENNER.

The analysis of water, gases, oils, minerals. Open to students who have taken Chemistry 4.

4 hrs., or an equivalent, both semesters. 8 units.

***7, 8. Organic Chemistry.** PROFESSOR GUILD.

Lectures on the carbon compounds; laboratory work in organic analysis and the preparation of organic compounds; vapor density and molecular weight determination. Open to students who have taken Chemistry 3, 4.

4 hrs., or an equivalent, both semesters. 8 units.

9. Synthetic Chemistry. PROFESSOR GUILD.

The preparation of pure chemical compounds from the crude mineral products. Open to students who have taken Chemistry 4.

2 hrs., or an equivalent, first semester. 2 units.

10. Physical Chemistry. PROFESSOR GUILD.

Lectures. Historical introduction leading up to a discussion of modern chemical theories. Open to students who have taken Chemistry 3.

4 hrs., second semester. 2 units.

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*Omitted 1909-1910.

***11, 12. Chemistry of the Rare Elements.**

ASSISTANT PROFESSOR BENNER.

The analysis and synthesis of uranium, molybdenum tungsten, vanadium and cerium compounds. Open to students who have taken Chemistry 6, 9.

4 hrs., or an equivalent, both semesters. 8 units.

CIVIL ENGINEERING.

PROFESSOR WATERBURY, MR. BLADES.

The courses in this department have been arranged with special reference to the engineering development of the Southwest. Stress will be laid on surveying, railroad and structural work, and irrigation engineering. The design throughout the courses is to give the student a thorough and practical knowledge of the essential principles of his profession, and to teach the technical practice of the times, so far as possible, without sacrificing in other directions.

1, 2. Surveying.

PROFESSOR WATERBURY AND MR. BLADES.

Use and care of surveying instruments, United States system of land surveys, city surveys, topographical and hydrographical surveying, mine surveying, and earthwork computations. Lectures, recitations, drawing, and fieldwork. Textbook: Johnson, *Surveying*. Open to students who have taken trigonometry, and who have taken or are taking Mechanic Arts, 1.

4 hrs., both semesters, M W F, 11 (lectures), and S, 8-12 (fieldwork). 8 units.

*3. Geodesy. PROFESSOR WATERBURY

Size and shape of the earth; latitude, longitude and azimuth determinations; base line apparatus; triangulation; and trigonometric levelling. Open to students who have taken Civil Engineering 1,2, and Astronomy 2.

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*Omitted 1909-1910.

1 hr., first semester. 1 unit.

***6. Concrete and Masonry Construction.**

PROFESSOR WATERBURY.

The theory and practice in reinforced concrete construction. Foundations on land and in water, coffer-dams, cribs, caissons, piers, and abutments, retaining walls, dams, and arches. Open to students who have taken Civil Engineering 14.

3 hrs., and one 3-hour laboratory and drafting period, second semester. 4 units

***7. Steel Mill Buildings.** PROFESSOR WATERBURY.

Graphical and analytical computation of stresses in roof and bridge trusses; a study of the details of structural steel designing; complete design with drawings, estimate of weights, and estimate of cost for a steel mill building. Text-book: Ketchum, *Steel Mill Buildings*. Open to students who have taken Civil Engineering 14.

2 hrs., and two 3-hour drafting periods, first semester. 4 units.

***8. Bridge Design.** PROFESSOR WATERBURY.

Computation of stresses due to moving loads upon various points of bridge structures; a detailed study of bridge designs and bridge erections; complete design with drawings, estimate of weights, and estimate of cost of a steel bridge. Text-book: Ketchum, *Design of Highway Bridges*. Open to students who have taken Civil Engineering 7.

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*Omitted 1909-1910.

2 hrs., and two 3-hour drafting periods, second semester. 4 units.

9. Railroad Engineering. PROFESSOR WATERBURY.

Preliminary and location surveys; simple and easement curves, turnouts and switches; principles of economic location as based upon cost of construction, operating expenses, alignment, and grades; maintenance of way. The fieldwork consists of the surveys for a railroad of sufficient length to secure familiarity with the methods of actual practice. Each student makes a complete set of notes, maps, profiles, calculations and estimates of cost. Text-book: Allen, *Railroad Curves and Earthworks*. Open to students who have taken Civil Engineering 1, 2.

3 hrs., and one 4-hour field period, T TH F 8, and M 1-5, first semester. 4 units.

11. Hydraulics. PROFESSOR WATERBURY.

Velocity and discharge from orifices, weirs, tubes, and pipes; flow in sewers, ditches, canals and rivers; measurement of water power; water wheels of various types. Text-book: Merriman, *Hydraulics*. Open to students who have taken Civil Engineering 1, 2 and Mathematics 4.

4 hrs., first semester; T W TH F 9. 4 units.

***13. Principles of Irrigation.** PROFESSOR WATERBURY.

A study of the present condition of irrigation development in the United States; irrigation legislation; methods of establishing rights to water, a brief reference to the engineering principles relating to the construction and maintenance of canals and reservoirs and the various means of diverting and measuring water for use in irrigation. Text-book: Wilson, *Irrigation Engineering*. Open to students who have taken Civil Engineering 1, 2, 11, 14. 3 hrs., and one 3-hour laboratory and drafting period, first semester. 4 units.

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*Omitted 1909-1910.

14. Materials of Construction.

PROFESSOR WATERBURY AND MR. BLADES.

The properties and uses of stone, brick, lime, cement, concrete, timber, iron, and steel. The computation of stresses in prisms, beams, columns, and shafts. Lectures, recitations and laboratory work. Text-book: Merriman, *Mechanics of Materials*. Open to students who have taken or who are taking Mathematics 5, 6.

3 hrs., and one 3-hour laboratory period, second semester. T W TH, 9, and M, 1-4. 4 units.

15. Contracts and Specifications. PROF. WATERBURY

The essential elements of a contract; items included in various kinds of engineering contracts and specifications; the preparations of a complete set of specifications and a contract. Text-book: Johnson, *Engineering Contracts and Specifications*. Open to all college students.

2 hrs., first semester; M W, 8. 2 units.

***17. Water Supplies.** PROFESSOR WATERBURY.

Methods of investigation of available supplies of water for public use; methods of purification of water; and a study of the design of water systems. Text-book: Turneaure and Russell, *Public Water Supplies*. Open to students who have taken or who are taking Civil Engineering 11. 3 hrs., first semester. 3 units.

***18. Sewage** PROFESSOR WATERBURY.

Methods of sewage purification; a study of sewage disposal plants; and a study of the design of sewer systems. Text: Folwell, *Sewage*. Prerequisite, Civil Engineering 11. 3 hrs., second semester. 3 units.

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*Offered 1910-1911.

ECONOMICS.

PROFESSOR CHANDLER.

1. **Introduction to Economic Theory.** PROF. CHANDLER.

A study of the main principles which underlie the science, with special reference to illustrations of their workings in the growth of industry and commerce in England and the United States. Although the work of this course is essentially theoretical, no opportunity is lost to supplement the study with practical illustrations drawn from the business activities of today. Seagers, *Introduction to Economics* is used as the basic text. Open to all college students.

3 hrs., first semester, M W F, 10. 3 units.

2. **Industrial and Tariff History of the United States.**

PROFESSOR CHANDLER.

A study of the rise of the factory system in the United States, and the origin and development of the leading American industries. The history of the tariff from 1789 to 1909 and its influence upon the development of manufacturing and the growth of trusts, as well as its relation to wages, fixed salaries, and the increased cost of living. Tariff reform. Open to all college students who have had Economics 1.

3 hrs., second semester, M W F, 10. 3 units.

3. **Corporation Finance and the Trust Problem.**

PROFESSOR CHANDLER.

Twentieth century methods of organizing and carrying on business. Problems attending the expansion of corporate enterprise and the growth of trusts. Legal status of the corporation; relations of corporation to business supremacy; methods of promotion and capitalization; monopoly price and methods; effect of trust development upon prices, wages and profits; the struggle of the independent entrepreneur; relation of government to industrial and commercial enterprise; Federal and state regulation; the function of the public service commissions. Open to all college students who have had one year of economics.

2 hrs., first semester, T TH, 11. 2 units.

4. Transportation and Commerce.

PROFESSOR CHANDLER.

Three phases of transportation are studied:

1. The rise of the American railway system, and its past and present relation to the development of agriculture, manufacturing, and other industries.

2. The present American railway system—its business organization, methods of combination and financial operations.

3. Relation of the railroad to the government and the public; rights of the shipper and the investor in railway securities; the Interstate Commerce Commission and Federal control of commerce; proposed reforms in state and Federal regulation, including a study of government ownership in Europe and Australia, with a discussion of its practical value if applied to American conditions. Open to all college students who have had Economics 1.

2 hrs., second semester, T TH, 11. 2 units.

***5. Money, Banking and Finance.**

PROFESSOR CHANDLER.

The functions of money and its relation to credit institutions; the monetary system of the United States; the theory and history of banking; function of the savings bank, the trust company, the clearing house, etc.; history of American finance, and financial crises in their relation to our present currency and banking systems; the examination of the principal banking systems of the world with a view to finding ideas which, if applied to American conditions, would render our system more nearly conformable to our growing financial and commercial needs. Open to all college students who have had one year of economics.

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*Omitted 1909-1910

3 hrs., first semester. 3 units.

***6. The Labor Movement.** PROFESSOR CHANDLER.

The history and growth of labor organizations; economic and social conditions of the working classes in Europe and the United States; organized labor vs. organized capital; strikes and lockouts; the closed shop; the secondary boycott; collective bargaining; the state in relation to labor; the use of the injunction; compulsory arbitration; labor legislation; law of conspiracy and recent court decisions.

3 hrs., second semester. 3 units.

***7. Introduction to the Study of Society.**

PROFESSOR CHANDLER.

A study of the underlying principles of social organization and development. History of the science up to date. The application of social principles to the most important problems which confront society in Europe and America, especially those problems attending the rapid development of cities and congested industrial centers.

2 hrs., first semester. T TH, 2. 2 units.

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*Omitted 1909-1910.

***8. Socialism and Social Reform.**

PROFESSOR CHANDLER.

History of the rise and development of modern socialism; scientific vs. Utopian socialism; present status of socialism as a practical and political reform movement; state socialism; the Fabians, etc.; other social-industrial reforms; profit sharing; land nationalization; labor copartnership, etc.

2 hrs., second semester. 2 units.

ENGLISH.

PROFESSOR BATES, MISS LUTRELL, MR. WALDRON.

The purpose of the literary courses outlined below is to give a general knowledge of English literature from its beginnings to the present time, chief stress being laid upon the study of representative authors, but with broader literary movements constantly in mind. The courses in composition aim to develop accurate thought and clear, vigorous expression; opportunity for work in advanced composition is afforded in connection with the courses in literature.

1. Composition. MR. WALDRON.

Narration and description; lectures and the study of Nettleton, *Specimens of the Short Story;* daily and weekly themes. Prescribed for all freshmen.

3 hrs., first semester, M W F, 10. 3 units.

2. Composition. MR. WALDRON.

Exposition and argumentation; study of Perry, *Argumentation*, class debates, impromptu speeches, and frequent themes. Prescribed for all freshmen.

3 hrs., second semester, M W F, 10. 3 units.

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*Omitted 1909-1910.

3, 4. Nineteenth Century Prose. PROFESSOR BATES.

From the publication of the Lyrical Ballads to the death of Ruskin, 1798-1899. The following writers are studied: Irving, Poe, Hawthorne, Emerson, Thoreau, Macaulay, Carlyle, Ruskin, Arnold, and Stevenson. Weekly papers on assigned topics; lectures and discussions. Primarily for freshmen.

2 hrs., both semesters, T TH, 10. 4 units.

5, 6. Elizabethan Drama. PROFESSOR BATES.

Attention is given first to the development of the Elizabethan drama from the Miracle Plays, Moralities, and Interludes; the Senecan influence is studied, and the work of Lyly, Greene, Peele, Kyd, and Marlowe briefly considered; then the bulk of the year is given to a close detailed study of the leading plays of Shakespeare, followed by a cursory treatment of the post-Shakespearian drama, at least one play being read from each of the following writers: Jonson, Beaumont and Fletcher, Heywood, Webster, Middleton, Massinger and Ford. Lectures and discussions and a thesis of not less than 2,000 words.

3 hrs., both semesters. T TH F, 11. 6 units.

***9, 10. Poetry Prior to the Nineteenth Century.**
PROFESSOR BATES.

This course affords a brief introductory view of Anglo Saxon literature (in translation), a discussion of medieval romances and ballads, and a study of Elizabethan lyrics, Spenser, Milton, the Augustans, and the forerunners of romanticism in the eighteenth century. Weekly papers on assigned topics; lectures and discussions.

3 hrs., both semesters, M W F, 8. 6 units.

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*Omitted 1909-1910.

11, 12. Poetry of the Nineteenth Century.

PROFESSOR BATES.

This course gives opportunity for the study of the following writers: Wordsworth, Coleridge, Scott, Byron, Shelley, Keats, Landor, Tennyson, Mrs. Browning, Robert Browning, Arnold, Rossetti, Morris, and Swinburne. Weekly papers on assigned topics, lectures, and discussions.

2 hrs., both semesters, M W 8. 4 units.

13, 14. Chaucer. MISS LUTRELL.

In this course a large part of the *Canterbury Tales* is read, the *Prologue to the Legende of Gode Wommen*, and some of the minor poems. The course is purely literary and a knowledge of Anglo-Saxon is not required.

3 hrs., both semesters; T TH F, 8. 6 units.

15, 16. Nineteenth Century Fiction. PROFESSOR BATES.

Lectures upon the lives and general position of the following authors: Austen, Scott, Dickens, Thackeray, Emily Bronte, Charlotte Bronte, George Eliot, Reade, Meredith, Hardy, and Stevenson. One work is read from each of these writers, and its intellectual substance, literary style, plot, characterization, and atmosphere are discussed.

2 hrs., both semesters; M W, 10. 4 units.

17, 18. Contemporary Literature. PROFESSOR BATES

The aim of this course is to afford such a study of British and American literature in the last quarter-century as will enable the student to form a clear estimate of present-day tendencies. It covers the decadent and symbolic schools of British poetry, the Irish movement, contemporary American poetry, the romantic and realistic schools of fiction, and the revival of the drama, with especial reference to the influence of Ibsen. Readings assigned in the poetry of James Thomson, Francis Thompson, Lang, Symons, Henley, Johnson, Yeats, Hovey, and Carman; in the fiction of Kipling, Hewlett, Gissing, Locke, and Herrick.; in the dramas of Ibsen, Pinero, Jones, Shaw, Wilde, and Phillips. Lectures upon these and other authors.

2 hrs., both semesters, T TH, 9. 4 units.

19, 20. Principles of Literary Criticism.

PROFESSOR BATES.

For graduate students and seniors obtaining special permission. The course is designed both to develop ability in research work, and to enable the student from his examination of critical theory to form satisfactory canons of taste. It is conducted as a seminar with reports and theses. In the first semester the following authors are studied: Plato, Aristotle, Sidney, Dryden, Addison, Pope, Johnson, and Burke. The second semester is devoted to writers of the nineteenth century, especially Wordsworth, Coleridge, Shelley, Hazlitt, Poe, Arnold, Pater, and various contemporary critics.

Hours and credits to be arranged with the instructor.

FRENCH.

PROFESSOR TURRELL, DOCTOR ALDRICH.

1, 2. Elementary French. DOCTOR ALDRICH.

First semester: Fraser and Squair, *French Grammar*, (Part I), Aldrich and Foster, *French Reader*. Second semester: Reading of Daudet, *La Belle Nivernaise*, Labiche and Martin, *La Poudre aux Yeux*, Halevy, *L'Abbe Constantin*. Composition and dictation. with drill on the irregular verbs.

5 hrs., both semesters, M T W TH F, 2:40. 8 units.

3, 4. Advanced French. PROFESSOR TURRELL.

First semester: Fraser and Squair, *French Grammar* (Part II), Merimée, *Colomba* or *Carmen*, Lamartine, *Graziella*, Sand, *La Mare au Diable* or *La Petite Fadette*. Second semester: Selected reading: including Canfield, *French Lyrics*, Victor Hugo, *Les Miserables* (abridged).

5 hrs., both semesters; M T W TH F, 1. 8 units.

5. French Literature to the Nineteenth Century.
PROFESSOR TURRELL.

The classical French dramatists. Reading of plays of Corneille, Racine and Moliere. Lectures on the eighteenth century, Voltaire, Rousseau, Diderot, etc. Beaumarchais, *Le Barbier de Seville*. Library readings.

3 hrs., first semester. 3 units.

6. French Literature in the Nineteenth Century.
PROFESSOR TURRELL.

Particular study of the drama. The Romanticists. Victor Hugo, Musset, Scribe, Augier, etc. Recent literary movements in France. Pailleron, Dumas, Rostand, Zola, Sardou, Hervieu, Maeterlinck, etc.

3 hrs., second semester. 3 units.

7, 8. Advanced Composition. PROFESSOR TURRELL.

Vreeland and Koren, *French Syntax and Composition*, Kron, *French Daily Life*, etc. Original essays and reports in French.

2 hrs., both semesters. 4 units.

Courses 5, 6, 7, 8 may be taken together or separately, but must be preceded by courses 1, 2, 3, 4.

GEOLOGY.

PROFESSOR TOLMAN AND MR. CHAPIN.

The earlier courses in geology are constructed not only to introduce the student to general and applied geology, but with special reference to the development of the observational faculties, and training in inductive and deductive reasoning so that the student may discover for himself the causes for each phenomenon observed. The more advanced courses are technical and cover the essentials of geology for a mining engineer. The courses in geological mapping allow the student to take advantage of the opportunities at hand for field work, and include reconnaissance and detailed field mapping and underground geological mapping. Special field work can be undertaken by advanced students under the direction of the department.

1, 2. General Geology. PROFESSOR TOLMAN.

Geological processes, their causes and effects. The atmosphere, surface and underground water, the ocean and the ice and snow as geological agents. Earth movements; mountain and continent building; vulcanism. Rocks, their origin and alterations. Historical geology, reviewing the physical history of the earth and correlated life progress.

The laboratory work covers the reading and interpretation of topographical and geological maps, the fundamentals of geological mapping, structural problems, and stereogrammatic and graphic methods for the solution of problems in faulting. Short field trips are taken in the second semester. Open to students who have taken or who are taking Mineralogy 1, 2.

3 hrs., and one laboratory period, both semesters, M T W TH, 8. 8 units.

3. Economic Geology—Non-Metallic Products.

PROFESSOR TOLMAN.

Statistics, production, utilization, value, occurrence, genesis and methods of investigation of iron and manganese and the non-metallic products, viz.: coal, gas, bitumen, etc.; building stones, clays, cement materials, sands, etc.; borax, phosphates, fluorspar, gypsum, graphite, mica, asbestos, mineral paints, etc.; salines, mineral waters, artesian flows, and investigation of underground water flow, etc.; precious stones.

3 hrs., first semester. 3 units.

4. Economic Geology—Metallic Products.

PROFESSOR TOLMAN.

Detailed study of ore deposits. Prerequisite, Geology 1, 2.

3 hrs., second semester. 3 units.

5, 6. Field Geology.

PROFESSOR TOLMAN AND MR. CHAPIN.

Construction of maps and sections. United States Geological Survey methods of geological mapping. Geological mine mapping and stereography. Two detailed geological maps are required of each student, one of a portion of the Tucson mountains (lava flows) and one of a district in the Rincon mountains (faulted and folded sedimentary rocks), a sketch reconnaissance map, and a geological map of mine workings. Open to students who have taken or are taking Geology 3, 4 and Mineralogy 3, 4.

All day Saturdays, or an equivalent, in the field, both semesters. 8 units.

***7. Type Fossils.** MR. CHAPIN.

Identification of the type fossils, especially of the Paleozoic.

2 hrs., first semester. 2 units.

GRADUATE WORK. Advanced work in economic and field geology will be arranged for those working for the Master's Degree or that of Engineer of Mines.

GERMAN.

PROFESSOR TURRELL, MISS ROBERTS.

1, 2. Elementary German. MISS ROBERTS.

First semester: Bacon, *German Grammar*, complete. Second Semester: Reading of Storm, *Immensee*, von Hillern, *Hoeher als die Kirche*, Manley and Allen, *Four German Comedies*. Composition, dictation and continued grammar drill.

5 hrs., both semesters, M T W TH F, 2:40. 8 units.

3, 4. Advanced German. MISS ROBERTS.

First semester: Pope, *German Composition*, with review of Syntax. Reading of Meyer-Foerster, *Karl Heinrich*, Heine, poems and *Die Harzreise*. Second semester: Composition continued. Lessing, *Minna von Barnhelm*, Schiller, *Wilhelm Tell*, etc.

5 hrs., both semesters; M T W TH F, 1:50. 8 units.

5, 6. Lessing, Schiller, and Goethe.

PROFESSOR TURRELL.

First semester: Reading and interpretation of Lessing, *Emilia Galotti*, *Nathan der Weise*, Schiller, *Maria Stuart*, *Wallenstein*. Accompanied by a brief outline of German literature to the ninteeenth century.

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*Omitted 1909-1910.

Second semester: Goethe, *Hermann und Dorothea*, *Egmont*, *Die Italienische Reise*, *Faust*, Part I.

3 hrs., both semesters. 6 units.

7, 8. German Literature in the Nineteenth Century.

PROFESSOR TURRELL.

First semester: The Romanticists and their successors. Class reading of Kleist, *Der Prinz von Homburg*, Grillparzer, *Der Traum ein Leben*, *Die Ahnfrau*, etc. Second semester: The rise of Naturalism and Symbolism. Wildenbruch, *Harold*, Fulda, *Der Talisman*, Sudermann, *Johannes*, Hauptmann, *Die versunkene Glocke*. Lectures and library readings.

2 hrs., both semesters. 4 units.

Courses 5, 6, 7, 8 may be taken together or separately, but must be preceded by Courses 1, 2, 3, 4.

GREEK.

MRS. NEWSOM.

***1, 2. Beginner's Course.** MRS. NEWSOM.

The work done is represented by White, *First Greek Book;* Goodwin, *Greek Grammar*; and Xenophon, *Anabasis* (first four books).

5 hrs., both semesters. 8 units.

3, 4. Homer and Plato. MRS. NEWSOM.

Homer, *Iliad* (first four books); Plato, *Apology* and *Crito;* and selections from Lysias.

5 hrs., both semesters, M T W TH F, 9:50. 8 units.

HISTORY.

PRESIDENT BABCOCK, ASSISTANT PROFESSOR CHANDLER.

In the work in history emphasis is placed on the social and political development, the relation of cause and effect, and the unity of history. The laboratory method is used whenever possible and individual work insisted on.

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*Omitted 1909-1910.

***1, 2. Political and Constitutional History of England.**

ASSISTANT PROFESSOR CHANDLER.

This course will cover the political history from Anglo-Saxon times to the battle of Waterloo. The development of the English constitution and the origin of other political and legal institutions contributed by England to modern civilization will be studied. Gardiner, *Students' History of England* is used as the general text, with Montague, *Constitutional History* for collateral study. Assigned readings, preparation of frequent reports and consultation of original sources where practicable. Open to all college students.

4 hrs., both semesters. 8 units.

***3, 4. American Colonial History.**

PRESIDENT BABCOCK.

A detailed study of the American colonies under Great Britain, and of the United States to the adoption of the Constitution. Lectures, assigned reading, and reports. Open to students who have taken History 1, 2.

3 hrs., both semesters. 6 units.

***5, 6. Constitutional History of the United States.**

PRESIDENT BABCOCK.

A detailed study of the formation of the Union and of the political and constitutional history of the United States down to 1856, based on letters and speeches of American statesmen, public documents and special histories. Open to students who have taken History 1, 2.

3 hrs., both semesters, T TH S, 8. 6 units.

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*Omitted 1909-1910.

***7, 8. Great Movements in History.**

PRESIDENT BABCOCK.

Lectures, with readings, on the great forces of history and the forms of their manifestation—migrations, religions, political and economic revolutions, etc.

2 hrs., both semesters, M W, 11. 4 units.

9. The French Revolution and the Napoleonic Period.

ASSISTANT PROFESSOR CHANDLER.

The causes, events and results of the French Revolution, and the spread of reform under Napoleon. The study of the revolution will be prefaced by a review of the state of European civilization in the middle of the eighteenth century and the influence of the French and English schools of literature, philosophy and economics as factors in the political and economic revolutions. Open to all college students.

3 hrs., first semester, M W F, 11. 3 units.

10. European History Since the Congress of Vienna.

ASSISTANT PROFESSOR CHANDLER.

A study of the liberal and reform movements, social, political, economic and intellectual, up to the present time; the evolution of constitutional government; the various movements towards national unity; the revolts of 1820, 1830 and 1848; the Eastern question; the Franco-Prussian war; and the rise of Germany to a commanding position in world commerce and politics; English reform bills of 1832 and 1867, and other political, religious and social-industrial reforms. Open to all college students.

3 hrs., second semester, M W F, 11. 3 units.

LATIN.

MRS. NEWSOM.

The courses below are open to students who have completed the first three years of Latin in the sub-collegiate department, or an equivalent. Constant thorough drills are given in technical grammar and prose composition. In reading, the matter is subjected to grammatical, metrical, rhetorical and historical explanation. The study of the text is made the means of mental discipline, of developing the faculties of observation and critical judgment, and of acquiring habits of thoroughness and accuracy.

Virgil, Livy, and Cicero. MRS. NEWSOM.

1, 2. Virgil, *Æneid*, Books V and VI; Livy, Selections; Cicero, *de Senectute*, *de Amicitia*. Exercises in prose composition.

4 hrs., both semesters. 8 units.

3, 4. **Tacitus and Horace.** MRS. NEWSOM.

Tacitus, *Germania* and *Agricola*, Selections from Histories; Horace, *Odes*.

3 hrs., both semesters. 6 units.

MATHEMATICS.

PROFESSOR E. M. BLAKE, ASSISTANT PROFESSOR MEDCRAFT.

1. **College Algebra.** ASSISTANT PROFESSOR MEDCRAFT.

One-fifth of the time of the course in college algebra is devoted to graphical methods. Prescribed for all freshmen in engineering courses.

4 hrs., and a 2-hr. laboratory period, first semester, M W TH F, 9, T, 8-10. 5 units.

2. Analytical Geometry.

ASSISTANT PROFESSOR MEDCRAFT.

The fundamental methods of analytical geometry; the straight line and circle; the properties of the conic sections; problems in loci; graphical solutions of equations. Prescribed for all freshmen in engineering courses.

4 hrs., and a 2-hr. laboratory period, second semester, M W TH F, 9, T, 8-10. 5 units.

3. Differential Calculus. PROFESSOR BLAKE.

The fundamental principles and formulae of the differential calculus, with their applications. Prescribed for sophomores in all engineering courses.

3 hrs., first semester, M W F, 9. 3 units.

4. Integral Calculus. PROFESSOR BLAKE.

The fundamental principles and formulae of integral calculus, with their applications. Prerequisite, Mathematics 3. Prescribed for sophomores in all engineering courses.

3 hrs., second semester, M W F, 9. 3 units.

5, 6. Analytical Mechanics. PROFESSOR BLAKE.

The mathematical treatment of the fundamental principles of dynamics and statics, illustrated and applied. Prerequisites, Mathematics 4, and Physics 1, 2.

4 hrs., and a 2-hr. laboratory period, first semester, and 4 hrs., second semester, M T W TH, 10. 9 units.

MECHANIC ARTS.

PROFESSOR HENLEY, MR. ISAACSON.

The courses in Mechanic Arts comprise the elements of shop work and drawing. The work consists of lectures, recitations and drawing, tool and machine work. The courses are designed with special regard for the needs of the students in engineering, an effort being made to familiarize the student with the ordinary methods in shop work, a knowledge of which is valuable to every engineer, rather than to develop the skill of the mechanic.

1. Mechanical Drawing. PROFESSOR HENLEY.

Elements of mechanical drawing, including lettering, tracing, and blue printing. The subject is treated in a purely mechanical way, the object being to enable the student to learn to make and read ordinary working drawings, and to give him some knowledge of ordinary drafting room practice.

2 laboratory periods, first semester, T, 1-4, S, 9-12 2 units.

2. Descriptive Geometry. PROFESSOR HENLEY

Elements of descriptive geometry, including problems in warped surfaces and intersection of solids.

2 lecture and laboratory periods, second semester. T 1-4, S, 9-12. 2 units.

3. Wood Shop. PROFESSOR HENLEY.

Bench and machine work; elements of pattern and foundry work.

2 periods, first semester, M, 1 (lecture), 2-4 (shop), W, 1-4, (shop). 2 units.

4. Forge Shop. PROFESSOR HENLEY.

Forge work in iron and steel; tempering, casehardening and annealing. A study of those characteristics of iron and steel which affect their working in the shop.

2 periods, second semester, M, 1 (lecture), 2-4 (shop), W, 1-4 (shop),. 2 units.

5, 6. Machine Shop. MR. ISAACSON.

This course includes the elements of machine shop practice, and the erection and care of machinery. The student is given work on the drill press, shaper, lathe, and planer, as well as at the bench and on the erecting floor. Only the ordinary classes of work are taken up, the object being to make it as much as possible, a general engineering course. Open to students who have had courses 1, 3, 4, or an equivalent.

2 periods, both semesters, TH, 1 (lecture), (shop), F, 1-4. 4 units.

7, 8. Advanced Machine Shop Practice. MR. ISAASCON.

This course is designed for students in mechanical engineering, or others who require a more thorough course than is given in courses 1, 3, 4. 5, 6. It continues the work of these courses and in addition takes up the various standard manufacturing methods. The work consists of shop work, lectures and reading, the equivalent of two half-days a week, both semesters, the hours to be arranged with the instructor. 4 units.

MECHANICAL ENGINEERING.

PROFESSOR BLAKE, PROFESSOR HENLEY AND MR. ISAACSON

1. Heat Engines.

PROFESSOR BLAKE AND MR. ISAACSON.

Principles of thermodynamics as applied to steam and internal combustion engines. Study of the general structural features and methods of operating the more important types of boilers, and steam and gasoline engines.

2 hrs. and a 3-hrs. laboratory period, first semester, T TH, 8, M, 1-4. 3 units.

2. Dynamo-Electric Machinery.

PROFESSOR BLAKE AND PROFESSOR HENLEY.

Theory underlying the generation, transmission, and utilization of electric currents. Description of the more important types of generators and motors. Prerequisite, Mechanical Engineering 1.

2 hrs., and a 3-hr. drafting period, second semester, T TH, 8, M, 1-4. 3 units.

3, 4. Kinematics of Machinery and Elements af Machine Design. PROFESSOR BLAKE.

Theory and design of linkages, gears, cams, screws, and other machine elements.

1 hr. and two 2-hr. drafting periods, both semesters. 6 units.

5, 6. Mechanical Laboratory. PROFESSOR BLAKE.

Operation, inspection, and testing of boilers, steam and gasoline engines, compressed air machinery and pumps.

1 hr., and two 3-hr. laboratory periods, both semesters. 6 units.

7, 8. Machine Design. PROFESSOR BLAKE.

Exercises in the designing of complete machines, such as a steam or gas engine, a pump, a compressor, a mine hoist, or a locomotive.

1 hr., and one 2-hr. drafting period, both semesters, 4 units.

9, 10. Power Plant Design and Economics.

PROFESSOR BLAKE.

Study of machinery installations as to arrangement of parts, adaptability to intended work, and economy of first cost and operation. Exercises in writing specifications and designs of such installations as the boiler plant and engines of an electric generating station, a pumping station for waterworks, an air compressing plant for a mine, or a stamp mill. As part of this course trips will be made to the mining districts of Arizona and Sonora, usually one or two weeks in March or April.

1 hr. and two 2-hr. drafting periods, both semesters. 6 units.

***11, 12. Alternating Currents and Electric Distribution.**

A general discussion of the theory of alternating currents; types of motors, generators and transformers, arrangement of circuits, line construction, long distance transmission.

3 hrs., both semesters. 6 units.

METALLURGY.

PROFESSOR GOODRICH.

1. Introduction to Metallurgy. PROFESSOR GOODRICH.

Physical properties of metals, alloys, thermal treatment of metals, thermal measurements, fuel, refractory materials, metallurgical processes, furnaces, thermochemistry, metallurgy of iron and steel. Seniors in Mining Engineering and Metallurgy. Lectures and recitations.

4 hrs. for 1 month, first semester. 1 unit.

2. Fire Assaying. PROFESSOR GOODRICH.

Fire assay for gold, silver and lead. Bullion assays. Prerequisite, Chemistry 3, 4.

15 hrs., or an equivalent, second semester (March, April, and May). M T W, 1-6 2 units.

3. Metallurgy of Gold and Silver.

PROFESSOR GOODRICH.

Stamp milling, chlorination, tube-milling, and filtering cyaniding, pan-amalgamation; Patio, and Tina processes; hyposulphite leaching practice, etc. Lectures and recitations. Prerequisite, Metallurgy 1, 2.

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*Offered in 1910-1911, in charge of Mr. E. J. Ryan Instructor-elect in Mechanical and Electrical Engineering.

4 hrs., first semester (except first month), T, 4, W TH, F, 8. 3 units.

4. Metallurgy of Lead and Copper.

PROFESSOR GOODRICH.

Sampling, receiving, purchasing, roasting; blast furnace methods, reverberatory furnace methods; pyritic smelting, converting, desilveration of base bullion, electrolytic refining, hydro-metallurgy of copper, etc. Lectures and recitations. Prerequisites, Metallurgy 1, 2, and 3.

4 hrs., second semester, T, 4, W F, 1, F, 8. 4 units.

5A. Metallurgical Laboratory. PROFESSOR GOODRICH.

Amalgamation, cyaniding, chlorination, hyposuphite lixiviation, etc., tests, together with mill work. This course runs parallel with Metallurgy 3. Lectures.

One weekly period, first semester. 1 unit.

5B. Metallurgical Laboratory.

Sampling, concentration, mill work. This course runs parallel with Metallurgy 7. Lectures.

One weekly period, first semester. 1 unit.

6. Advanced Metallurgical Laboratory.

PROFESSOR GOODRICH.

This course is a continuation of Metallurgy 5 (mill work), for such students as have completed Metallurgy 5, and who desire more practical experience in ore testing. New machinery is being constantly added to the mill, which becomes available for this course.

2 periods, second semester. 2 units.

7. Ore Dressing. PROFESSOR GOODRICH.

Breaking, crushing, separating, concentrating, sampling; mill processes and management. Lectures and recitations. Prerequisites, Chemistry 3, 4, and Metallurgy 2.

3 hrs., first semester, M W F, 11. 3 units.

***8. Metallurgy of Rare Metals.** PROFESSOR GOODRICH.

Metallurgy of zinc, cadmium, nickel, mercury, bismuth, tin, antimony, cobalt, platinum, tungsten, molybdenum. Lectures and recitations. Prerequisites, Metallurgy 1, 2, and 3.

2 hrs., second semester. 2 units.

9. Excursions. See Mining Engineering 7, 8.

MINERALOGY.

PROFESSOR GUILD.

The main object of the courses in mineralogy is to familiarize the student with facts and methods that will enable him to determine the character of an ore or mineral by observation of its physical properties and by the performance of a few simple tests with the blowpipe, since in the field and mine recourse can not usually be had to a well equipped chemical laboratory.

1, 2. General Mineralogy. PROFESSOR GUILD.

Lectures and recitations in crystallography and the classification and uses of minerals; laboratory work in blow-pipe analysis and determinative mineralogy; the study of a type collection of 600 minerals arranged and classified according to Dana. Text-books: Dana, *Text-book of Mineralogy*, and Brush, *Manual of Determinative Mineralogy and Blow-pipe Analysis*. Prerequisites, Chemistry 2, and Physics 2.

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*Omitted 1909-1910.

2 hrs., and two 3-hr. laboratory (blow-pipe) periods, first semester. 4 units (crystallography 2, blow-pipe 2). 3 hrs., or an equivalent, second semester, 3 units.

3. **Optical Mineralogy.** PROFESSOR GUILD.

With microscopic study of the rock-forming minerals. Prerequisites: Geology 2, and Mineralogy 2.

2 hrs., or an equivalent, first semester. 2 units.

4. **Petrography.** PROFESSOR GUILD.

The preparation of thin sections of rocks for microscopic study, and the study of a type selection of rocks. Prerequisite, Mineralogy 3.

2 hrs., or an equivalent, second semester. 2 units.

5. **Crystallography.**

The measurement, projection and drawing of crystals. Prerequisite, Mineralogy 1.

Either semester 2 or 4 units.

MINING ENGINEERING.

PROFESSOR TOLMAN.

In this course attention is largely directed to the operations and economics of mining, and the laboratory and drafting work is so arranged that the student will have plans and designs which will be of value in the practice of the profession.

1, 2. **Lectures on Mining.** PROFESSOR TOLMAN.

Location of claims; mining laws of the important mining countries of the world; prospecting; excavations, tunnels, shafts, and methods of timbering; underhand, overhand, square sett, filling and caving methods of mining; pumping; ventilation; transportation; hoisting; mining machinery, its installation; and surface improvements of mines.

Methods for undeveloped properties compared with those for developed mines. Mine accounts, cost sheets, stope sheets, assay plans; methods of management; mine sampling and mine reporting.

2 hrs., both semesters. 4 units.

3. 4. Laboratory in Mining. PROFESSOR TOLMAN.

The study of designing of timbering, and mining constructions of all kinds, ore bins, heat-frames head-gear, dumping devices, etc.

One 3-hr. laboratory period, both semesters. 2 units.

5, 6. Technical Mining Literature.

PROFESSOR TOLMAN.

The summarizing of the current literature on mining, and arrangement of a card index of the same.

One 3-hr. labortaory period, both semesters. 2 units.

7. Practical Mining.

Before entering upon the work of the senior year, all students who are candidates for the degree of B.S., in Mining Engineering,must have spent at least four weeks in practical underground mining, or for the degree of B.S. in Metallurgy, four weeks in a metallurgical plant, or in underground mining, preferably the former. The fulfillment of this requirement must be evidenced by the certificate of the mine superintendent or foreman, and by notes and sketches of the processes observed, to be presented to the faculty of the School of Mines, and discussed with them.

***8. Summer School of Mine and Topographical Surveying.**

A 4-weeks course in the field during which detailed mine surveys will be carried out. The course will be given during the month of June, and in the northern part of the Territory where the high elevation makes the summer climate delightful. Required of all students taking the degree of B. S. in Mining Engineering, after June, 1912, unless the equivalent of actual underground surveying is offered. This course should be taken preferably at the close of the sophomore year. Open to students who have taken Civil Engineering 1, 2.

9. Field Excursions.

In connection with the courses in mining engineering and metallurgy, trips will be made to mining districts in Arizona and Sonora, usually one or two weeks in March or April. These trips are required of all candidates for the degree of B. S. in Mining Engineering and in Metallurgy.

The purpose of these trips is to afford the student an opportunity for close study and inspection of mining and metallurgical plants, and of rock formations and of minerals of commercial value. The students are accompanied by members of the faculty, and every effort is made to make the trips of the greatest practical value. The visits are carefully scheduled and notes, with sketches, measurements and photograpbs are taken, and elaborated into comprehensive reports by each student after the return.

During April, 1910,the mining districts and the reduction plants of Globe, Miami, and Ray were visited in this way. The thanks of the University are due the managers and superintendents of the various mining companies for their efforts and care in acquainting the students with the work under their management.

PHILOSOPHY AND EDUCATION.

MRS. STANLEY.

1, 2. **History of Philosophy.** MRS. STANLEY.

A study of the basal concepts and fundamental problems of philosophical thought as developed historically. Lectures, recitations, and assigned reading. Texts: Weber, *History of Philosophy*; Calkins, *The Persistent Problems of Philosophy.*

3 hrs., both semesters. M W F, 9. 6 units.

3. **Psychology.** MRS. STANLEY.

A special consideration of the subject as applied to teaching. Lectures, recitations, and collateral reading. Open to sophomores, juniors, and seniors. Text: Angell, *Psychology.*

2 hrs., both semesters. 4 units.

*4. **Pedagogy.** MRS. STANLEY.

An account of educational evolution, both as a culture fact in the history of civilization and as a foundation for professional work. Arrangements have been made with the Tucson City Schools to provide practice work for this class. Open to students who have taken Philosophy 3.

2 hrs., both semesters, M W, 10. 4 units.

*5. **Logic.** MRS. STANLEY.

Text: Jevon, *Logic*; reading from Mill, Hamilton, Thompson, and others. Open to juniors and seniors.

4 hrs., first semester. 4 units.

6. **Ethics.** MRS. STANLEY

Theoretical and practical ethics; view of the historical development of the science; origin and development of the moral consciousness; application of the principles of ethics to the problems of life. Lectures, discussions, and assigned reading. Open to juniors, and seniors. Text: Dewey and Tufts, *Ethics*.

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*Offered 1910-1911.

3 hrs., second semester. 3 units.

***7. Philosophical Problems in Great Books.**

MRS. STANLEY.

A comparative study of interpretations of life as revealed in masterpieces of the world's literature.

This course is designed to meet the needs of students who can not afford the time for advanced English or philosophy, as well as to supplement the course now offered in those departments. The programme as planned will include ten great books, viz.: Sophocles, *The Antigone;* Socrates, *The Apology; The Book of Job;* Dante, *Divine Comedy;* Hugo, *Les Miserables;* Goethe, *Faust;* Tolstoi, *Anna Karenina;* Ibsen, *Peer Gynt.* Lectures and interpretatixe readings. Open to all juniors and seniors.

1 hr., both semesters, F, 8. 2 units.

PHYSICAL TRAINING.

MR. KLEEBERGER, MISS MERRIMAN.

The department of physical training has general direction of the gymnastic and athletic activities of the University. The department aims to give the students such exercises, games and sports as will best create and maintain a vigorous physical health, and to this end it strives to reach as many persons as possible, especially the weak and undeveloped, and to give to each one exercise that will at once benefit, interest, and stimulate.

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*Omitted 1909-1910.

Physical training is prescribed for all freshmen and sophomores from October 1st to May 15th. With the approval of the director of the gymnasium, students may substitute some form of regular athletic work for the course in the gymnasium for specified periods.

A. Physical Examinations for Men. MR. KLEEBERGER.

The examination includes about thirty measurements of the body, tests of strength, and examination of the heart, lungs, and other vital organs, together with inspection for marks of vaccination and physical inequalities. Prescribed for all freshmen and sophomores at the beginning of the year or on entrance into these classes. A second examination is optional with the instructor, while a rigid and complete special examination by the University physician may be ordered at any time without expense to the student.

1, 2. Gymnastics and Hygiene for Men.

MR. KLEEBERGER.

Setting up exercises, calisthenic drills, indoor games, and simple apparatus work. Lectures on the physiology of exercise, personal hygiene and corrective exercises. Required of all freshmen unless excused on recommendation of the University physician.

2 half-hour periods, both semesters. 1-2 unit.

3, 4. Advanced Gymnastics. MR. KLEEBERGER.

A continuation of the work of the first year; the use of apparatus, parallel bars, horizontal bar, horses, rings, out-door runs, etc. When possible the class will be divided into graded sections for special work on the apparatus. Required of all sophomores unexcused by the University physician.

2 half-hour periods, both semesters. 1-2 unit.

5, 6, 7, 8. Gymnastics for Women.

MR. KLEEBERGER AND MISS MERRIMAN.

The work is prescribed for young women as for men, and resembles that for men in its general scope and aim. It is, however, modified to suit the needs of the young women, emphasis being laid upon poise, carriage, grace, and development. Music is used for class drills, marching, and dancing. A gymnasium suit is necessary, consisting of a loose blouse waist, divided skirt, and the regular gymnasium shoes. The waist has a sailor collar trimmed with white braid. Four yards of double width, 54-inch dark blue serge is required, if Butterick patterns are used; ready-made suits may be purchased for about $4 at the gymnasium. Required of freshmen and sophomores.

3 half-hour periods each semester. 2 units.

B. Football, Baseball, Basketball, Tennis, and Field and Track Work.

Recreative sports as a relaxation from study and as a means of development are recognized by the University in its provisions of fields, courts, etc., and by its acceptance of time devoted to such sports, with the approval of the director of the gymnasium, as satisfaction for part of the requirements in physical training. Save for the traditional seasons fixed for these sports by climatic conditions in other regions, they might all be indulged in throughout nearly the whole academic year, as is the case with tennis. The direct control and management of these sports and of the competitive games with outside teams, are vested in the Athletic Association of the University of Arizona, made up of both students and faculty, but officered by students. During the current year, contests have been held with the University of New Mexico, and the Fort Huachuca team in football; with the Tempe Normal School in Tempe and in Tucson, in baseball and tennis; with the Phoenix high school, in Phoenix; and Tucson, in baseball; with the Bisbee high school in basketball; and with the Tucson high school in baseball and basketball.

PHYSICS.

PROFESSOR DOUGLASS.

The object of this course is to acquaint the student with the fundamental physical principles which underlie the higher courses of chemistry, mechanics and engineering. Note books are required in all courses.

1, 2. **General Physics.** PROFESSOR DOUGLASS.

Lectures, recitations and laboratory work. First semester: mechanics and heat. Second semester: Electricity, wave motion, sound and light. The laboratory experiments give prominence to general electrical measurements, but include the study of wave motions and their application to the other subjects. Prerequisites: a course in elementary physics and mathematics 1.

2 hrs., and two 2-hr. periods in the laboratory, both semesters., M W F, 11-12, T TH, 10-12. 8 units.

3. **Thermodynamics and Heat.** PROFESSOR DOUGLASS.

A study of the foundation principles underlying mechanical engineering, latent and specific heats, conductivity, expansion, mechanical equivalent, high temperatures, cycles, entropy, properties of steam, etc. Prescribed for third year in mechanical engineering course.

1 hr. and two 2-hr. periods, first semester. 3 units

4. Electrical and Optical Measurements.

PROFESSOR DOUGLASS.

A study of the electrical machines and instruments used in mechanical engineering, and of the optical instruments handled in mining and civil engineering courses. Prescribed for the third year in mechanical and civil engineering courses. Three 3-hr. periods, second semester. 4 units.

SPANISH.

PROFESSOR TURRELL, DOCTOR ALDRICH.

1, 2. Elementary Spanish. DR. ALDRICH.

First semester, Hills and Ford, *Spanish Grammar*, Turrell, *Spanish Reader*, begun. Conversation and oral work. Second semester: grammar and reader completed; additional readings with composition and dictation.

5 hrs., both semesters. I, M T W TH F, 9; II, M T W TH F, 11:30. 8 units.

3, 4. Advanced Spanish. DR. ALDRICH.

First semester: Reading of Johnson, *Cuentos Modernos*, Alarcón, *El Capitan Veneno*. Second semester: Galdós, *Marianela*, Valdes, *La Alegria del Capitan Ribot*, etc. Three hours each week during the first semester and two hours during the second will be given to composition, letter writing and syntax, using Umphrey, *Spanish Composition* and Bonilla, *Spanish Daily Life*.

5 hrs., both semesters, M T W TH F, 1. 8 units.

5. Spanish Literature to the Nineteenth Century.

PROFESSOR TURRELL.

Lectures in Spanish on the early literature of Spain, the "Siglo de Oro," etc., with library readings. Class study of Cervantes, *Don Quijote* (Selections), Lope de Vega, *La Estrella de Sevilla*, Calderón, *La Vida es Sueno*, etc.

3 hrs., first semester; M W F, 9. 3 units.

6. Spanish Literature in the Nineteenth Century.

PROFESSOR TURRELL.

Particular study of the drama. Reading of Moratin, *El Si de las Ninas*, Larra, *Partir a Tiempo*, Gutiérrez, *El Trovador*, Tomayo y Baus, *Lo Positivo*, Nunez de Arce, *El Haz de Lena*, Echegaray, *El Gran Galeoto*, Galdós, *Electra*.

3 hrs., second semester; M W F, 9. 3 units.

***7. General Survey of the Literature of the Countries of Spanish America.** PROFESSOR TURRELL.

Class reading of Ugarte, *La Joven Literatura Hispanoamericana*, Hills, *Bardos Cubanos*, Avellaneda, *Baltasar*, etc.

2 hrs., first semester, T TH, 9. 2 units.

***8. History of Mexican Literature.**

PROFESSOR TURRELL.

Reading of works by the best authors, as included in the *Biblioteca de Autores Mexicanos*, etc.

2 hrs., second semester, T TH, 9. 2 units.

9, 10. Advanced Spanish Composition and Commercial Spanish. PROFESSOR TURRELL.

A practical course in writing and speaking Spanish. Harrison, *Spanish Correspondence*, Remy, *Spanish Composition*, etc. will be used. Original essays, letters and reports in Spanish. (May be taken with courses 5, 6, but must be preceded by courses 1, 2, 3, 4.)

2 hrs., both semesters. 4 units.

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*Omitted 1909-1910.

ZOOLOGY

MR. BROWN

1. Invertebrate Zoology. MR. BROWN.

The development and anatomy of types of the various phyla of invertebrates. Text: Parker and Haswell, *A Manual of Zoology.*

2 hrs. of lectures and 6 hrs. of laboratory work, first semester, M W, 3, M W, 2-3, T TH, 2-4. 4 units.

2. Vertebrate Zoology. MR. BROWN.

A continuation of course 1.

4 units.

LAW.

MR. GALBRAITH

1, 2. Elementary Law. MR. GALBRAITH.

The first semester will deal with the leading principles in each of the more prominent branches of the law, including Crimes, Contracts, Torts, Titles, Wills, Mortgages, Bills and Notes, etc.

The second semester will deal more intensively with federal and state regulation of commerce, and mining and irrigation law.

The course will be primarily a lecture course, but for those desiring full credit toward a degree, collateral reading and study of cases will be required.

3 hrs., both semesters; M W TH, 7 P. M. 4 units.

PUBLIC LECTURES AND ADDRESSES TO THE STUDENTS.

1909–1910.

September 24.

William Jennings Bryan. "Faith."

October 22.

Robert H. Forbes, Director of the Agricultural Experiment Station. "Our Farmers and Our Future."

November 18.

Allen T. Bird, Editor of "The Oasis," Nogales. "The Invisible Empire of Transportation."

November 30.

George R. Parkin, Organization Secretary of the Rhodes Scholarship Trust. "Cecil Rhodes and the Rhodes Scholarships."

December 3.

Henry Suzallo, Professor of the Philosophy of Education in the Teachers' College, Columbia University. "The Meaning of University Training."

December 16.

Francis J. Heney, Special Assistant District Attorney, San Francisco. "Civic Duties."

December 17.

Louis C. Hill, Supervising Engineer of the United States Reclamation Service in Arizona and Southern California. "The Economic Importance of Government Reclamation Work, with especial Reference to Arizona."

January 15.

James H. McClintock, Press Correspondent and Postmaster, Phoenix. "The relation of the Press to the Development of Arizona."

February 1.

Anita Newcomb McGee., formerly Acting Assistant Surgeon, United States Army, and Supervisor of Nurses in the Japanese Army. "Experiences in the Japanese Army."

February 10.

Joseph E. Stubbs, President of the University of Nevada. "The Obligations of the College Man."

March 8.

Henry S. Pritchett, President of the Carnegie Foundation for the Advancement of Teaching. "Educational Democracy and Student Obligation."

April 12.

James C. Monaghan, National Lecturer of the Knights of Columbus. "Opportunity."

April 9, 12, 16.

Ellsworth Huntington, Assistant Professor of Geography in Yale University.

"The Yale Expedition to Palestine." (Illus.)

"Briton and Russian in Asia."

"Climate and History." (Illustrated).

April 20.

William L. Finley, Ornithologist and Author. "Hunting Wild Birds with a Camera," (Illus.).

April 14.

H. V. Failor, Secretary of the Tucson Chamber of Commerce. "The Purpose and Work of Commercial Organizations with Special Reference to the Tucson Chamber of Commerce and its Relations to the Development of Arizona."

SHORT COURSE IN AGRICULTURE.

This course is offered, first, to meet the demands of prospective homeseekers who desire to learn something about the general principles and practices of irrigation farming before engaging in actual farm operations in Arizona. Second, to give the young man who feels that he can not afford the time or the means to pursue a full college course a brief introduction to some of the more important scientific principles and facts that are the basis of successful farming, before he settles down to his chosen business, as well as to give him a measure of that broad general culture that is always incidental to University life, and which makes so much for good citizenship. Third, to equip young men to take advantage of opportunities and to fill positions demanding more intelligence and skill than ordinary farm labor. Opportunities and positions for young men of such training are now open in Arizona and will become more frequent as the great reclamation projects being carried on are completed. As specific examples may be mentioned: First, the employment as present by the U. S. Reclamation Service and private ditch companies of many ditch superintendents, all of whom need special training for the work. These positions are constantly changing personnel and the number of such men so employed will more than double within the next two years. The positions pay from $75 to $135 per month. Second, there are vast areas of desert land in Arizona that may be reclaimed by pumping, and the opportunities for development of this kind of irrigation farming have scarcely been touched; but to make the most of such opportunities one will need more mechanical skill and more knowledge of the physical properties of soil than the average farmer possesses. Third, the University has recently had several calls for farm managers at salaries ranging up to $150 per month, and expects such calls to increase in number. Courses in Irrigation Engineering, Farm Management, Soil Physics, Vegetable Gardening, Orchard Management, and Farm Dairying, are especially designed to equip young men to take advantage of these opportunities and positions.

ADMISSION.

Students will be admitted to the short course who have a general knowledge of the common school branches and sufficient maturity in years to understand the value of their time and opportunity. They will be accorded the same privileges, and required to observe the same regulations, as other students registered in the University and resident upon the campus.

EQUIPMENT.

The University is amply equipped with library, laboratory, and green-house facilities, while the development of a farm of 80 acres recently purchased will give opportunity for an abundance of practice in the application of the knowledge gained in the class room, library, laboratory and green houses.

The following outline of the course of study indicates the scope of the work done. In addition to the time spent in the class room indicated below, students will be required to do a limited amount of work on the farm, for which they will be paid by the University.

I YEAR.

FIRST SEMESTER.	SECOND SEMESTER.
Breeds of Farm Animals...3	Breeds of Farm Animals.3
Plant Culture and Orchard Management...5	Farm Management.....3
	Gardening.............3
Algebra..................5	Algebra................5
English...................5	English................5
Drawing and Shop........5	Drawing and Shop......5

II YEAR.

Feeds and Feeding........3	Soils...................5
Dairying..................5	Veterinary Science......5
Poultry...................3	Principles of Breeding...5
Irrigation Engineering.....5	Chemistry..............5
Chemistry...............5	

BUREAU OF MINES AND ASSAYING.

A separate department of the School of Mines under the name of "The Bureau of Mines and Assaying" has been established to receive and work ores, and to make assays and analyses of ores, minerals, mineral waters and petroleum.

In accordance with the Act of the Legislature of the Territory, approved March, 1897, and amended in March, 1899, assays of ores and minerals are made for the prospectors and miners of Arizona and for others at fixed rates established by the law, and tabulated below. To meet the requirements of this work a special laboratory building of brick has been erected and maintained. Qualitative determinations of the nature of samples are made free.

Extreme accuracy and excellence of work are considered of more importance than pecuniary profits. All assays are made in duplicate and if not accordant are repeated. The work of the Bureau is under the personal direction of the professor of metallurgy and a paid assistant; the assays are not made by students, who receive their instruction in the regular laboratories of the University.

The money received for assaying is deposited monthly to the credit of the assay fund which is used to pay the assayer and the cost of material and apparatus.

RATES FOR ASSAYING AND CHEMICAL DETERMINATIONS.

COMMON ASSAYS AND CHEMICAL DETERMINATIONS.

One element only:

Gold, or silver, or copper, or lead, or iron, or insoluble	$1.00
Zinc, or calcium, or magnesium, or sulphur, or manganese	1.50
Silicon or chlorine	2.00

Combinations:

Gold and silver	1.00
Copper and iron, or lead and iron	1.50
Insoluble, copper, and lead	2.00
Insoluble, copper, and iron	2.00
Insoluble, lead, and iron	2.00
Insoluble, zinc, and iron	2.50
Insoluble, lead, copper, and iron	2.50
Gold, silver, copper, and lead	2.50
Gold, silver, copper, iron, and insoluble	2.50

SPECIAL CHEMICAL DETERMINATIONS.

One element only:

Aluminum, or tungsten, or barium, or chromium	3.00
Cadmium, or tin, or arsenic, or bismuth or antimony, or titanium, or sodium, or potassium, or uranium, or phosphorus	$4.00
Nickel, or cobalt, or molybdenum, or vanadium	5.00

CHEMICAL ANALYSIS.

Coal and coke analysis, giving moisture, volatile combustible matter, fixed carbon and ash	5.00
The same, including determination of sulphur and phosphorus	7.50
Silicate analysis	15.00
Cement analysis (chemical)	15.00

Cement analysis (mechanical)	2.50
Cement tests for strength and soundness by the Department of Civil Engineering	3.00
Boiler water analysis	10.00

RATES FOR TESTING ORES.

Stamp mill amalgamation, including sampling, assays, retorting, etc.:

For lots of one ton or thereabouts	$30.00
The same, with concentration of pulp on Wilfley table	30.00
For lots of two tons, without concentartion	40.00
For lots of two tons, with concentration	45.00

Smaller amalgamation tests, including all sampling charges, and concentration after amalgamation:

For small samples, up to five pounds	7.00
For small samples, five to twenty-five pounds	10.00
For small samples, twenty to one hundred pounds	15.00

In these smaller tests, the sample is ground to pass a suitable mesh, and is agitated with mercury. The mercury is panned out, retorted, and the values determined in bullion. The values in the concentrates and tailings are also determined. The number of tests necessary to determine the adaptability of any ore to treatment in cyaniding varies so greatly that no general rates can be offered.

CONSIGNMENTS, REMITTANCES, ETC.

Samples, ores, and other consignments should be shipped to the University of Arizona, the School of Mines, Tucson, Arizona. Small quantities may best be sent by mail, at the rate of one cent per ounce; larger quantities by express or by freight. The Wells Fargo Express Company makes daily deliveries at the University.

All assays, chemical determinations and chemical analyses, except gratuitous qualitative tests mentioned elsewhere, must be paid for in advance.

No determination of any kind will be made until the required payment arrives. Remittances should be made by postoffice money order, Wells Fargo money order, bank draft, or check on a Tucson bank, payable to K. C. Babcock, President, University of Arizona, to whom also business communications relating to matters discussed in this circular should be addressed.

AGRICULTURAL EXPERIMENT STATION

STAFF.

Kendric C. Babcock, Ph. D., President of the University.
Robert H. Forbes, M. S., Director and Chemist.
John J. Thornber, A. M., Botanist.
Albert E. Vinson, Ph. D., Biochemist.
Frederick W. Wilson, B. S., Animal Husbandman.
G. E. P. Smith, C. E., Irrigation Engineer.
Robert W. Clothier, M. S., Agriculturist.
George F. Freeman, B. S., Plant Breeder.
William B. McCallum, Ph. D., Associate Botanist.
William H. Ross, Ph. D., Assistant Chemist.
Frank C. Kelton, B. S., Assistant Engineer.
A. W. Morrill, Ph. D., Entomologist.
E. Dana Trout, Secretary.

ORGANIZATION AND WORK.

The Agricultural Experiment Station is a legally constituted department of the University, whose purpose is to aid "in acquiring and diffusing * * * useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and applications of agricultural science."

With the above objects in view the organization of the station, includes the departments of administration, agriculture, horticulture, animal husbandry, botany, plant physiology and pathology, chemistry, and irrigation investigations, the whole or a major portion of the time of one or more members of the station staff being devoted to each department of the station work. Provision is made for meterological work also, though to a less degree.

Owing to the wide variation in agricultural conditions in Arizona, it has been found of advantage to distribute the work so that each department is located, so far as possible, in that region most favorable to the accomplishment of its own special results. According to this principle, the various lines of Experiment Station work have been distributed as follows:

The Director's office and the departments of botany, plant physiology and pathology, chemistry, and irrigation investigations are maintained at Tucson in the University buildings. Through this arrangement the Experiment Station profits by the buildings and libraries of the University, while the University is benefitted from time to time by the teaching ability of members of the Station staff. It has been found that from this base of operations the three great agricultural districts of the Territory—Salt River Valley, the lower Colorado, and the upper Gila—are accessible with equal convenience for field work and observations.

On the same ground—fitness of location for the work undertaken—the Experiment Station Farm has been maintained and strengthened at Phoenix. Salt River valley is intermediate in elevation, in situation, and in mean yearly temperature, between the other two important farming districts above mentioned, and for this reason the agricultural and horticultural results obtained there are capable of the most general application in the Territory at large.

On the same principle again, the date palm orchard, conducted in co-operation with the United States Department of Agriculture, is located in the alkaline district south of Tempe, where a successful demonstration of this palm as a commercial fruit producer will be of the greatest value, creating use for great areas of alkaline land in the arid southwest.

The demonstration farm near Yuma, in the fertile Colorado valley bottom, has likewise afforded a succession of object lessons to the public of that locality, as well as much needed information concerning crops, agricultural methods and markets for that rich region.

Experiments in dry-farming have been undertaken on tracts in the Sulphur Springs Valley, between Willcox and Douglas, and in the neighborhood of Snowflake in Navajo County, in localities typical of large areas.

The range station, also, for the study of worn-out range country with a view to its reclamation to usefulness, is conducted in a typical district near Tucson, and is conducted under the auspices of the department of botany, co-operating with the United States Department of Agriculture.

The results of the Experiment Station work are made public at frequent intervals in the bulletins and reports of the Station. These publications are made in two series: First, the longer and more technical bulletins, stating in considerable detail the investigations as they mature; and, secondly, the Timely Hints for Farmers, which are brief writings issued at the time when they will be most useful, written in plain language, and presented in popular form.

Along its several general lines of effort the Station during the ten years ending with 1909 has issued 108 publications, exclusive of annual reports which contain much technical information of similar character. These publications may be classified as follows:

Soils, waters, alkali, and farm management	25
Climate	1
Crops	40
Weeds, insect pests and plant diseases	15
Irrigation	10
Animal industry and the range	17

When it is remembered that for years past the mailing list has enabled us to reach from forty to fifty per cent of the farming population of the Territory, it is not surprising that the effects of Station work are now generally in evidence, more particularly in our irrigated southern valleys.

Continuing with former appropriations the Twenty-Fifth Territorial Legislature set aside $13,100 for the use of the Experiment Station for the bienium ending in 1911. This appropriation provides for printing, for Farmers' Institutes, for dry farming experiments, for the maintenance of the date orchard at Tempe and the demonstration farm at Yuma. Supplementing the Federal funds, therefore, provision is made for the symmetrical development of this work in the Territory, both experimentally and educationally; and, prospectively, "the farmers' college" bids fair to increase in usefulness to the growing agricultural interests of the Territory.

PREPARATORY DEPARTMENT.

FACULTY.

KENDRIC CHARLES BABCOCK, Ph. D., President.
HENRY A. E. CHANDLER, B. S., Principal.

CHARLES A. TURRELL, A. M., French, German, Spanish.
WILLIAM W. HENLEY, A. B., Shopwork and Drawing.
ANDREW ELLICOTT DOUGLASS, D. Sc., Physics.
ROBERT W. CLOTHIER, M. S., Agriculture.
CAPT. HIRAM M. POWELL, Military Science and Tactics.
WILLIAM GEORGE MEDCRAFT, A. M., Mathematics.
RAYMOND C. BENNER, Ph. D., Chemistry.
LEVONA PAYNE NEWSOM, Ph. D., Latin and Greek.
FRANK LEWIS KLEEBERGER, B. S., Physical Training and Mathematics.
FREDERICK E. TALMAGE, B. L., Bookkeeping, Stenography, Typewriting.
IDA C. REID, Ph. B., Mathematics and History.
HELEN JANE ALDRICH, Ph. D., Spanish and French.
CAROLINE BATES SINGLETON, A. B., English and Latin
ETHELBERT W. WALDRON, A. B., English.
ELIZABETH ELLINWOOD ROBERTS, A. B., German.
WILLIAM L. FOWLER, B. S., Animal Husbandry.
FRANCES CROWELL, Music.

GENERAL INFORMATION.

In this department the University offers the work of a well organized, four-years high school, with the added advantages of shop work and drawing, and military drill. The general library and gymnasium are open to all students in this department.

The equipment of the scientific laboratories is available for use in this preparatory work, whenever it can be used advantageously, and makes possible strong work in elementary science. The instructors in this department are assisted by the professors of the college departments, several of whom regularly conduct preparatory classes. By reference to the course of study which follows, it will be seen that it offers a comprehensive training for those who may not be able to pursue their studies farther, while it gives a good preparation for college.

Admission to regular standing in the first year of the preparatory course presupposes the completion of the work of the eighth grade of the public or parochial schools. Students who do not bring certificates showing the completion of this work, must take examinations to test their ability to pursue profitably the work of the first year. Pupils who have not completed the work of the ninth grade (or the first year of a high school) will not be admitted into the University from cities in Arizona having more than 5,000 population.

All students entering the preparatory department will be required to take an examination in oral reading. To remedy notable deficiency in this subject, the University will require extra work in addition to other studies. In all cases in which the preparation of a student in a particular subject proves to de deficient, the University reserves the right to require the student to secure at his own expense the help of an approved coach until the deficiency is remedied.

LIVING ACCOMMODATIONS AND EXPENSES.

A portion of South Hall is set apart for the use of male preparatory students; details of furnishings, living expenses, etc., are set forth in a paragraph earlier in this Register. These expenses are substantially the same for both college and preparatory students, save that laboratory fees and book bills are higher for the former. The expenses necessarily incurred during the academic year are about $300, but of this amount nearly one-third falls due in the first month, or in the six weeks before November 1st, in the form of charges which are made but once during the year The following are the estimated ordinary expenses for the first month:

Incidental fee	$5.00
Mattress, blankets, pillows, sheets, etc., (unless brought from home by the student)	15.00
Board for the first month, including napkin fee	18.50
Books	6.00
Shop and Drawing fee	5.00
Military uniform	16.25
Student Associations (voluntary)	5.00
	$73.75

The dormitory is placed in charge of two resident instructors, assisted by a committee of students. Inspection of rooms is made in the morning and in the evening by the head of the dormitory. The hours from seven to quarter past nine in the evening are observed as study hours except on Fridays and Saturdays. Students under twenty-one years of age are required, unless relieved by the President, to obtain permission to leave the campus, or to leave the dormitory during study hours, except on Sundays from nine to twelve

A. M., Wednesdays, four to seven P. M., and Fridays, four to six P. M. Breaches of the regulations of the dormitory are punished by "extra study"—labor about the buildings or grounds—by confinement to rooms, or by expulsion from the dormitory; for damage to University property, a money penalty is imposed.

COURSE OF STUDY.

The following course of study will be required of all students who fit themselves at the University for entrance to the freshman class in 1911. Such variations from it will be permitted as will adapt it to the case of students who took part of their work in other schools.

Military drill is required of all able-bodied male students throughout the course. Physical training is required of all students, unless they are excused by the President upon presenting a certificate from one of the University physicians. The young men have drill three times per week and exercise in the gymnasium twice. The young women have physical culture three times a week.

The language begun in the first, second or third year must be pursued for at least two years in order to secure credit towards graduation.

Though the subjects are for convenience grouped by years in the following schedule, the departmental method is followed. In the description of courses, the subjects are arranged by groups or departments in the consecutive order in which they are taken up and students will be required to take them in this order. Aside from this sequence the ability of each student must determine what subjects will be pursued at any given time, due regard being given to the proper balance of subjects. The wishes of parents will always be given careful consideration in making up the schedule of work for each student, but the final decision in the matter rests with the committee on registration, which is composed of persons who have had long experience in secondary and collegiate teaching. Individual attention will be given to the needs of each student.

To each student who completes the studies of this course, receiving a total of fifteen and one-half units (a unit representing a subject pursued for one year with five, or four, recitation periods per week), a certificate stating that fact will be given, entitling the holder to admission to the corresponding University courses of instruction without examination.

Subjects thus marked (*) are electixe. Five hours of elective must be chosen in the second year. In the third and in the fourth year, electives making up at least nine hours must be chosen. The figures indicate hours or exercises per week.

FIRST YEAR.

English	5
Algebra	5
Greek and Roman History	3
Physical Geography	3
Drawing and Shop work, or agriculture, or a foreign language	5

SECOND YEAR.

English	5
Algebra	5
European History	5
*Agriculture	5
*Bookkeeping	5
*Drawing and shopwork	5
*A foreign language, 1st or 2nd year	5

THIRD YEAR.

English	5	*Foreign languages, 1st, 2nd, or 3rd year Latin, each	5
Plane Geometry	5		
*Chemistry	5		

FOURTH YEAR.

English	5	*Latin (2nd or 3rd yr)	4
American History and Civics	5	*Greek (2nd year)	5
*Solid Geometry (1st half)	4	*French (2nd year)	5
*Trigonometry (2nd half)	5	*German (2nd year)	5
*Physics	5	*Spanish (2nd year)	5

ENGLISH.

The English of the preparatory course is based upon what is known as the entrance requirements of New England colleges. The work is in general divided into three parts: classics, studied in class; composition and grammar work done partly in class and partly outside; and supplementary reading done largely outside the class room. All these parts of the work may be carried on at the same time, as the circumstances of the class seem to require, the classics and supplementary reading forming the basis of a large part of the work in grammar and composition. Throughout the course, however, a primary aim is to develop the student's individual power of expressing himself in words. The time allotted to these three phases of English varies from year to year, increasing attention being paid to the appreciative and critical faculty as the course advances. In the fourth year a brief outline history of English literature occupies about one-half of the year's work in English.

Five hours each week throughout the course are given to English. According to the following general outline, selections from the list below are made at the discretion of the teacher, preference being given to the New England College Entrance Requirements, which are marked by an asterisk *.

FIRST YEAR.

ENGLISH GRAMMAR AND COMPOSITION receive one-half of the time of the first year. Maxwell, *Advanced Lessons in English Grammar* is used as a text-book.

CLASSICS. Shakespeare, **Merchant of Venice*, Scott, *Marmion*, Irving, **Sketchbook*, Longfellow, *Hiawatha*, Franklin, *Autobiography*, Burroughs, *Sharp Eyes*.

SUPPLEMENTARY READING. Longfellow, *Evangeline*, Scott, **Ivanhoe* and *The Talisman*, Cooper, *Last of the Mohicans*, Hale, *Man Without a Country*, Mark Twain, *Tom Sawyer*, Jack London, *Call of the Wild*, Wells, *War of the Worlds*.

SECOND YEAR.

COMPOSITION AND GRAMMAR. As in the first year, with attention to figures of speech, reproducing the work of classic authors, elementary etymology, exercises in composition, narration, and description.

CLASSICS. Coleridge, **Ancient Mariner*; Poe, **Poems* and *Tales;* Hawthorne, **House of the Seven Gables;* Tennyson, **Idylls of the King;* Lowell, **Vision of Sir Launfal;* George Eliot, **Silas Marner*.

SUPPLEMENTARY READING. Scott, *Lady of the Lake;* Blackmore, *Lorna Doone;* Irving, **Alhambra;* Kingsley, *Westward Ho;* Dickens, *Oliver Twist;* Bret Harte, *Luck of Roaring Camp;* Stevenson, *Treasure Island*.

THIRD YEAR.

Composition and Rhetoric. Continued, with emphasis on elementary exposition and argumentation. Herrick and Damon, *Composition and Rhetoric* is used as a text-book.

Classics. Shakespeare, **Julius Caesar* and *Midsummer Night's Dream;* Addison, **Sir Roger de Coverley Papers;* Macaulay, *Essays on Addison* and **Johnson;* Goldsmith, *Vicar of Wakefield;* Carlyle, *Essay on Burns;* the Poems of Burns; Burke, **Speech on Conciliation.*

Supplementary Reading. Moore, *Lalla Rookh;* Irving, *Life of Goldsmith;* Austen, *Pride and Prejudice;* Dickens, *Tale of Two Cities;* George Eliot, *Mill on the Floss;* Barrie, *Sentimental Tommy.*

FOURTH YEAR.

Composition and Grammar. Exercises in narration and description for flexibility and ease of expression and general preparation for college entrance requirements.

History of English Literature. Study of Moody and Lovett, *First View of English Literature*, as a text-book, and reading of the following masterpieces: Chaucer, **Prologue to the Canterbury Tales;* Shakespeare, **Macbeth* and **Henry V;* the shorter poems of *Milton, Wordsworth, *Byron, Shelley, Keats, Tennyson, and *Browning; Scott, *Pirate;* Dickens, *David Copperfield;* George Eliot, *Adam Bede.*

MATHEMATICS.

Algebra. First year: introduction, factoring, fractions, simple equations, simultaneous equations, and special problems. Second year: involution, evolution, theory of exponents, radicals, quadratic equations, and proportion. The ground covered by these two years will be required for entrance to the engineering courses in college.

PLANE GEOMETRY. Third year: emphasis is laid on thorough work in original exercises.

SOLID GEOMETRY. First semester, fourth year, with original exercises.

PLANE TRIGONOMETRY. Second semester, fourth year.

MECHANIC ARTS.

This work consists of both drawing and shop work, between which subjects the student's time is about equally divided. The course covers two years and is designed to furnish a thorough elementary knowledge of manual training as taught in the secondary schools of the country.

DRAWING. First year: Freehand sketching in perspective and orthographic projection. Reinhart's lettering, freehand working drawings. Second year: Mechanical drawing and geometrical problems.

SHOP WORK. First year: "Sloyd," care and use of woodworking tools. Second year: Forging, joinery, wood turning.

SCIENCE.

It is the object of the courses in science to initiate the student into the processes and methods used in laboratory work; to teach close observation, careful manipulation and logical deduction; to acquaint the student with the fundamental facts of the various branches of science and to give full practice in the use of good English in describing various observations and experiments.

To insure better results in the notebooks, they will all be passed upon by one of the instructors in English.

PHYSICAL GEOGRAPHY.

This course, combining the laboratory method with the text-book, aims to give the pupils training in exact observation of familiar phenomena, like distance, weight, pressure of liquids and gases, temperature, winds, clouds, and the habits of plants and animals. The natural forces producing erosion, formation of soil, and rocks, the processes of nature as seen in seed germination and plant growth (with demonstrations with the microscope) will be discussed, with frequent experiments and field excursions. The entire country within the reach of the University is a great natural laboratory, full of interest and information for all. The course explains these features which become so familiar to everyone residing here.

CHEMISTRY.

A year's work with the text and in the laboratory, in such proportions as the instructor decides upon. Each student must keep a notebook in which he describes the process and results of his laboratory work.

PHYSICS.

The course aims to show that physics is not something abstract or mysterious, but is the simple explanation of everyday occurrences not usually understood and often unnoticed. It consists of three recitation periods and four laboratory periods per week, carried on along the lines laid down for the senior year in secondary schools. Each student must keep a notebook in which a minimum number of experiments must be written up.

HISTORY.

The aim of the work in history is to lead the pupil to see the development of races and nations along political, social and religious lines, and to arouse in him a love for the subject and a habit of broad and discriminating reading.

The work of the first year consists of a survey of the development of the characteristics of the Greek and Roman civilizations. A text such as Wolfson, *Essentials of Ancient History*, or West, *Ancient History* will be supplemented by collateral reading and a notebook.

The work of the second year includes medaeval and modern history. The aim is to give the student an idea of the essential unity of history and the leading facts in the political development of races and nations. Harding, *Essentials of Mediaeval and Modern History*, is used, supplemented by the reading of references.

Hart, *Actual Government*, is the textbook in civics. The historical development of the subject is made prominent, while practical problems, such as taxation and municipal govenrment, are made the subjects of special investigation and study. The text in history will be Channing, *Students' History of the United States*.

LATIN, GREEK, FRENCH, GERMAN, AND SPANISH.

Any one of these languages may be begun in the first or second or third year, and must be pursued for at least two years. Two languages may not be begun in the same year.

For an outline of the courses in Latin and Greek see pages 46, under requirements for admission.

For an outline of the courses in French, Spanish and German, see pages 76, 100, 80.

BOOKKEEPING AND COMMERCIAL PRACTICE.

Bookkeeping is taught by the modern budget system. The work is individual and each student may progress as fast as his time and ability permit. The course is thorough in all the details of office practice. Students are made familiar with different filing cabinets, the filing of letters, the use of card ledgers, the copying and indexing of letters and bills in copy books. The course includes instruction in commercial law, with special emphasis laid on the ordinary forms of commercial paper and the different endorsements. The department is equipped with the latest vertical files, cabinets, letter press and office sundries. All students in bookkeeping are required to take some other branch of mathematics and must show proficiency in English.

STENOGRAPHY AND TYPEWRITING.

A complete course in stenography is offered. The Gallagher-Marsh system, a system which has received the highest endorsement of leading court reporters on the Pacific Coast, and which has been adopted by the Boards of Education in the largest cities of California, has been used for six years. The object of the course is to train students so that they may become practical stenographers and a large amount of practicing outside the class is required. With this end in view particular stress is laid upon neatness, filing, copying and indexing. This branch of the commercial department is equipped with up-to-date filing cases, office sundries, and six typewriters, four of which are Remington, one an Oliver, and one the L. C. Smith Visible. Five of the typewriters are new. *Students taking this work are required to have had one year of High School English, and to take English with this course.*

ALUMNI REGISTER.

The Alumni Association of the University of Arizona, organized on the second day of June, 1897, represents the body of graduates of the University; its object, as expressed in its constitution, is "To promote the interests of the University, to secure unity among its graduates and to foster an attachment to our Alma Mater."

1895.

*Charles Oma Rouse, B. S.

Mercedes Anna Shibell, B. S., (Mrs. A. J. Gould), Tucson.

Mary Flint Walker, B. S., (Mrs. Pearl Adams), Benson.

1897.

Edward Marshall Boggs, C. E. (nunc pro tunc), Chief Engineer Oakland Electric Railways, Oakland, California.

Clara Cramond Fish, B. S., (Mrs. F. C. Roberts), Tucson.

George Ojeda Hilzinger, B. S., Attorney, Tucson.

Mark Walker, B. S., Metallurgist, Los Angeles, California.

1898.

Hattie Ferrin, B. S., (Mrs. Charles Solomon), Safford.

Granville Malcolm Gillett, B. S., Draughtsman in Surveyor General's Office, Phoenix.

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*Died 1906.

Minnie Watts, B. S., (Mrs. W. B. Smith), Altaville, California.

*John Desha Young, B. S.

1899.

Robert L. Morton, B. S., Assayer, Yuma.

1900.

Ida Clarissa Flood, B. S., (Mrs. G. Dodge), Oakland, California.

Samuel Pressly McCrea, B. S., A. B., Principal of High School, Redwood City, California.

Charles Pierce Richmond, B. S., Mining Engineer, Phoenix.

Florence Russell Welles, B. S., (Mrs. Wm. Angus), Los Angeles, California.

1901.

Rudolph Castaneda, B. S., Engineer, Nacozari, Sonora, Mexico.

Clara Ferrin, B. S., Teacher, Tucson.

George Millard Parker, B. S., Denver, Colorado.

David Hull Holmes, B. S. (nunc pro tunc), Architect, Tucson.

1902.

Andrew Gilbert Aiken, A. B., B. S., Surveyor, Canton, New York.

Moses Blumenkranz, B. S., Assistant Superintendent Shannon Copper Company, Metcalf.

* *Ruth Brown, Ph. B., (Mrs. Wilkins Manning), Tucson.

Felix Grundy Haynes, B. S., Casa Grande.

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*Died 1899.

*Died 1910.

Rose Belle Parrott, Ph. B., Teacher, Roseburg, Oregon.

Phillip Matthem Reilly, B. S.

Bertram L. Smith, B. S., Engineer, Silver Bell.

Bessie Smith, Ph. B., (Mrs. Earle Davis), Douglas.

Walter James Wakefield, Cashier, B. S., Tucson.

1903.

Advanced Degrees:

LL. D., Hon. William Herring, Tucson.

M. A., John William Gorby, (B. A., Marietta), Chicago, Illinois.

M. A., Benjamin Franklin Stacey, (B. A., B. D., Lombard), Teacher, Pasadena, California.

Richard Lamar Drane, B. S., Assistant Chief Engineer Randolph Lines, Tucson.

George Mark Evans, (LL. B., Michigan), Ph. B., Teacher, Los Angeles, California.

Leslie Alexander Gillett, B. S. (Mining), Draughtsman, Surveyor General's Office, Phoenix.

Georgia Ann Holmesley, Ph. B., Teacher, Clifton.

Edward Horton Jones, B. S., Assayer, Denver, Colorado.

John Williard Prout, Jr., B. S., General Manager Santa Cruz M. and S. Co., Mowry.

Thomas Edward Steele, B. S., Assayer, Sasco.

1904.

William Burnham Alexander, B. S., Civil Engineer, Tucson.

Elbert John Hollingshead (Kimble), B. S., Clerk, Seattle, Washington.

Estella Markham Prout, Ph. B. Teacher, Mowry.

John Willard Prout, Jr., B. S. (Mining), see 1903.

1905.

*Ora Elinor Norway, Ph. B.

1906.

Advanced Degree:

M. S., William B. Begg, (A. B., Toronto).

Chester Bennett Clegg, B. S. (Civil Engineering).

John Wesley Gebb, B. S., Jerome.

Roy Bartley Kilgore, B. S. (Mining), Seattle, Washington.

Roy Gibbons Mead, B. S. (Mining), California.

Roy Webb Moore, B. S. (Mining), Mining Engineer, Tucson.

Carobel Murphey, (A. B., Cox College), Ph. B., Teacher, Tucson.

Ida Christina Reid, Ph. B., Instructor, University of Arizona, Tucson.

Minnie Louise Wooddell, Ph. B., Teacher, Tucson.

1907.

Advanced Degree:

Engineer of Mines, John Willard Prout, B. S., (Mining). See 1903.

Charles Alexander, Ph. B., Teacher, Tempe.

Harriet Estella Brown, Ph. B., Teacher, Tucson.

Lawrence Brodhead Croasdale, B. S. (Mechanical Engineering), Draughtsman, Delaware Water Gap, Pa.

Weda Ina Purcell, Ph. B., (Mrs. Ivy Marshall,) San Francisco, California.

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*Died 1908.

Hugh Maupin Wolflin, B. S., U. S. Testing Engineer, Seattle, Washington.

1908.

Honorary Degree:

LL. D., William Phipps Blake, Sc. D., Tucson.

Carroll Pitkin Bradstreet, B. S., Pachuca, Mexico.

Benjamin Scott Dinsmore, B. S., Kingman.

William Arthur Tarr, B. S. (Mech. Eng.), Oklahoma, (Agricultural); B. S. (Mining), University of Chicago, Chicago, Illinois.

Hugh Maupin Wolflin, B. S. (Mining). See 1907.

Leigh Ernest Worthing, B. S., Bay City, Michigan.

1909.

Burrell R. Hatcher, B. S. (Mining), Mining Engineer, Tucson.

Ethel A. Hooper, Ph. B., Tucson.

Grace Ysabel LaBaree, Ph. B., Teacher, Tucson.

Anita Calneh Post, Ph. B., Teacher, Yuma.

John Mosheim Ruthrauff, B. S. (Metallurgy), Assayer, Silver Bell.

Arthur Perry Thompson, B. S. (Mining), Garfield, Utah.

Mabel Wilkerson, Ph. B., Recorder's Office, Tucson.

MILITARY ORGANIZATION.

MAY 29, 1910.

Commandant of Cadets:
Captain Hiram McL. Powell, U. S. A.
Assistant to Commandant:
Major Warren A. Grossetta, N. G. A.

STAFF.

Adjutant	Acting Second Lieutenant L.D. La Tourrette.
Sergeant Major	Howard W. Estill

COMPANY A.

Captain	Clifton H. Rolfe
First Lieutenant	Arthur O. Lovejoy
First Sergeant	J. Urbano Salazar
Sergeant	Ernest L. Barnes
Sergeant	Frank L. Culin
Corporal	Homer B. Gaddis
Corporal	W. Harold Munds
Corporal	Allen Tracy Bird, Jr.

COMPANY B.

Captain	Sidney R. Jones
Second Lieutenant	Wm. R. Campbell
First Sergeant	Frank M. Cannon
Sergeant	James L. Bone
Sergeant	L. Guy Wilkey
Corporal	J. Stuart Bogan
Corporal	Richard L. Merritt
Corporal	Ben H. Clark

TRUMPETERS.

Sergeant	Carlos Castaneda
Corporal	Marcus A. S. Ming
Private	Lawrence S. Hedges
Private	Chas. F. Simonds
Private	Daniel Olney

COLOR GUARD.

Sergeant	Ralph Rigg
Sergeant	Earle P. Durley
Private	Fred W. Rogers
Private	Emil K. Wuerdeman

REGISTER OF STUDENTS.

GRADUATES—13. 9

Bates, Florence Fisher, A. B., Michigan; A. M., Columbia English	Tucson
Chapin, Theodore, B. S., Occidental Geology, Mineralogy.	Tucson
Ham, Roscoe, B. S., Missouri (School of Mines) Geology, Mining Engineering.	Tucson
Hooper, Ethel Amis, Ph. B., Arizona Mineralogy.	Tucson
Layne, Newton Meade, A. B., Southern California English, Modern Languages, History.	San Diego
Murphey, Carobel, A. B. Cox College, Ph. B., Arizona English.	Tucson
Parsons, Belle English.	Tucson
Roberts, Elizabeth Ellinwood, A. B., Western Reserve Spanish, French.	Tucson
Schurtz, Vera Zoe, A. B., Michigan Spanish.	Tucson
Singleton, Caroline Bates, A. B., Wellesley English, German.	Tucson
Turrell, Norine Gayden, B. L., Shorter Spanish.	Tucson
Wilkerson, Mabel, Ph. B., Arizona Business Practice.	Tucson
Waldron, Ethelbert Webb, A. B., Michigan English.	Tucson

9

SENIORS—11.

Blades, Ernest Orrin	Tucson
Callaway, Lawrence Arthur	Tucson
Carpenter, Miles Miller, B. S., Texas (Agricultural)	Tucson
Disney, Lester	Sedan, Kansas
Doan, Fletcher Morris, Jr.	Douglas
Douglass, Ida Whittington	Tucson
Grossetta, Warren Arthur	Tucson
Hoyt, Joseph Clyde	Jerome

Millar, Leslie Creighton	**Tucson**
Nash, Willard Henry	**Rapid City, S. D.**
Turner, R. Izer	**Huntington Beach, Cal.**

2 JUNIORS—12.

Harrison, Ralph Waldo	Ashland, Wis.
Hartman, Miner Louis	Phoenix
Lugibihl, Myron Robert	Bluffton, Ohio
Lusk, Harry Wilton	Tucson
McDole, Maynard Matthew	Tucson
Purcell, Ivy Mae	Tucson
Rebstock, Duane	Tucson
Rider, Jane Herbst	Tucson
Rose, Francis Winfred	Solomonville
Steele, Willard Penn	Mansfield, Ohio
Strong, Leon Henri	Tucson
Welliver, George Warman	Oxford, Ohio

SOPHOMORES—22. 2

Barnes, Ernest Lee	Humboldt
Bogan, Phœbe M.	Tucson
Bone, James Lee	Phoenix
Bryan, William Jennings, Jr.	Tucson
Chisholm, Raymond	Tucson
Coles, Henry Oliver	Bisbee
Durley, Earle Preston	Bisbee
Groweg, Edward A.	Defiance, Ohio
Higgins, John Joseph	Los Angeles, Cal.
Johnston, Clifford French	Tempe
Kitt, Katherine Foote	Tucson
McDermott, Ora Martina	Tucson
McNeil, Clara May	Tucson
Mitten, James Ralph	Worthington, Ind.
Nishihara, George Shikataro	Tucson
Rice, Thomas Briggs	Douglas
Rick, Leo Zeno	Tucson
Sine, Eva Jessie	Tucson
Sine, Janet Volume	Tucson
Spaulding, George Frederick	Phoenix

Wilky, Leslie Guy	Phoenix
Wuerdeman, Walter Henry	Tucson

5 FRESHMEN—27.

Aldrich, Howard C.	Allentown, Pa.
Bradstreet, Herbert Neal	Bisbee
Brown, Marguerite Bernice	Tucson
Campbell, Otis Muscott	San Bernardino, Cal.
Cook, John Carl	Douglas
Corda, Mamie Wilhelmina	Tucson
DeLuce, Dona Dea	Dome
Estill, Howard Wilmot	Tucson
Falvey, Edwin Carnicle	Bisbee
Flannagan, James Joseph	Los Angeles, Cal.
Firth, Charles Abraham	Aravaipa
Irvine, Elroy S. J.	Phoenix
Jackson, Benjamin Surnon	Bisbee
Jones, Sidney Raymond	Clifton
LaTourrette, Lyman D.	Phoenix
Lovejoy, Arthur Luccock	Tucson
McDole, Ruth Sophie	Tucson
Merriman, Ethel Roxanna	San Jose, Cal.
Merritt, Richard Louis	Prescott
Munds, William Harold	Prescott
Pearson, Sophie Shannon	Wawaka, Texas
Peterson. J. Earl	Mesa
Schiek, Albert G.	Los Angeles, Cal.
Wetenkamp, Paul	Bisbee
White, Edwin Henry	Dos Cabezos
Whitwell, Sturges Bigelow	Tucson
Williamson, William Roy	Los Angeles, Cal.

12 UNCLASSIFIED COLLEGE—34. 5

Amstutz, Miss E.—Spanish, French	San Francisco, Cal.
Archibald, Charles—Civil Engineering, Mechanic Arts,	Los Angeles, Cal.
Batte, Homer Benjamin—Civil Engineering, Astronomy,	Tucson
Bowen, Mary Shelton—English	Tucson
Cadwell, Genevieve Frances—Spanish	Tucson
Cameron, Alice Faith—English, Economics, Spanish	Tucson

[illegible]

[illegible]

Cameron, Jean Hunter—Spanish	Tucson
Castaneda, Carlos—Chemistry, Botany	Benson
Felt, Lee Williamson—French, Latin	Emporium, Pa.
Garland, Eldon A.—Law, Business Practice	Tucson
Goodrich, Catherine Woolston—German	Tucson
Gossage, W. H.—Law	Tucson
Guild, Marilla Merriman—English, Philosophy	Tucson
Haskell, Edward E.—Law, Business Practice	Tucson
Hofmann, Gladys Buellah—English	Tucson
Johnson, Erving A.—Mechanic Arts	Morenci
Kavanaugh, Rose Agnes—Zoology	Tucson
McClure, John Clarendon—Mathematics, Physics, Mechanic Arts 9	Tucson
Martin, Gladys Sarah—English	Tucson
MacDougal, Louise Fisher—Philosophy, French	Tucson
Newcomb, Sue—Spanish, English	Brookfield, Mo.
O'Connell, Mildred Linza—English	Tucson
Olney, Beula Oakley—English, History	Safford
Parker, Sumner William—Agriculture	Anderson, Ind.
Perry, Laura Josephine—English, French	Tucson
Price, Helen Maude—Spanish	Tucson
Rodee, Nona Martin—English, Spanish, Philosophy	Tucson
Rodgers, Helen—Zoology	Canaille
Rolfe, Clifton Howard—Mechanic Arts	Swansea
Roletti, Charles John—Mathematics	Tucson
Ross, Catherine Allen—German, Astronomy	Tucson
Thornber, Harriett Brown—Philosophy	Tucson
Trippel, Amy Irene—English, Astronomy	Tucson
Wright, Alice Littlefield—French, Spanish	Tucson

SHORT COURSE AGRICULTURE—9. 13

Aldrich, Howard C.	Allentown, Pa.
Caywood, Arthur B.	Clifton
Hochderffer, George E.	Flagstaff
Jennison, Paul	Covina, Cal.
Marshall, Thomas K.	Tucson
Olney, Daniel Clinton	Safford
Parker, Sumner William	Anderson, Ind.
Tierce, Homer Fleming	Cananea, Mex.

Wooddell, De Leslie	Tucson

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FOURTH PREPARATORY—18.

Barker, Anna Ruth	Tucson
Batte, Homer Benjamin	Tucson
Bird, Allen Tracy, Jr.	Nogales
Brown, Beryl	Tucson
Cannon, Frank Mullen	Congress Junction
Clark, Benjamin Harrison	Benson
Culin, Frank Lewis, Jr.	Helvetia
Hofman, Gladys Buellah	Tucson
Kavanaugh, Rose Agnes	Tucson
Ketchum, William Russell	Tucson
Lawson, Alice Patton	Pearce
O'Connell, Mildred Linza	Tucson
Rodgers, Helen	Canaille
Rogers, Frederick William	Tucson
Roletti, Charles Joseph	Tucson
Rolfe, Clifton Howard	Swansea
Salazar, Jose Urbano	Chihuahua, Mex.
Talcott, Elizabeth	Rockford, Ill.

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THIRD PREPARATORY—28.

Barrow, Samuel George	Tombstone
Beauchamp, David Carl	El Paso, Texas
Bird, Walter Duane	Nogales
Bogan, John Stewart	Tucson
Campbell, William Riggs	Tucson
Colton, Fannie Alberta	Safford
Gaddis, Homer Baker	Kingman
Gossard, Basil L.	Kempton, Ind.
Greenfield, Walter	Little Rock, Ark.
Hayes, Virginia	Cananea, Mex.
Hofmeister, Irene Louise	Tucson
Holly, Mary Louise	Tucson
Ijams, Clyde W.	Safford
James, Herbert Hanna	Avalon, Pa.
Lindsley, Richard	Tucson
MacDougal, Alice	Tucson
Mack, Francis Cagwin	Tucson

McReynolds, William B.	Tucson
Nichols, Louise Wichman	Tucson
Overlock, Lowell Winfield	Tucson
Rea, Helen	Tucson
Richards, David LaMadrid	Altar, Mexico.
Scheerer, Cedric Ezra	Twin Buttes
Storrs, Marguerite Chloe	Silver Bell
Udall, Gladys Madge	Tucson
Wakefield, Edith	Tucson
Wuerdeman, Emil K.	Tucson
Wyatt, Jane Dillon	Los Angeles, Cal.

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SECOND PREPARATORY—20.

Bennie, John Willis	Clifton
Brichta, Louis C.	Tucson
Catron, Gertrude Leona	Cananea, Mex.
Cloud, Leo Frederic	Tucson
Davis, Minnie Carmen	Tucson
Foreshaw, Lea Theodore	La Barranca, Mex.
Glennon, Joseph Henry	Nacozari, Mex.
Hummel, Florence	Cortaro
Isbell, Woodruff Charles	Tucson
Jarvis, Zola Bohall	Tucson
Kendall, Marcus Todhunter	Ocean Park, Cal.
Larsson, Axel	Tucson
McFarland, Robert Victor	Tucson
McConnell, Dee Charles	Tacoma, Wash.
Ming, Marcus Aurelius Smith	Fort Sill, Okla.
Patton, Marion Lee	Bisbee
Pusch, Maybelle	Tucson
Powers, Helen R.	San Pedro, Cal.
Simonds, Charles F.	Hermosillo, Mex.
White, Arthur Laurimer	Bisbee

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FIRST PREPARATORY—10.

Cowell, Bryan Rooke	Nacozari, Mex.
Greenfield, Cora	Little Rock, Ark.
Hedges, Lawrence Seitz	Chattanooga, Tenn.
Lee, George	Anderson, Ind.
Nielsen, Eddie	Globe

Norton, Marianna	Mohawk
Pound, William Roy	San Pedro, Cal.
Spalding, Charles Raymond	Safford
Stewart, Jeb	Florence.
Wilkerson, Edith Alma	San Bernardino, Cal.

UNCLASSIFIED PREPARATORY—18.

Castaneda, Carlos—Latin	Benson
Christenson, Elmer W.—Chemistry, English, Mathematics,	Tucson
Corda, Mamie W.—Algebra	Tucson
De Luce, Dona Dea—Trigonometry	Dome
Estill, Howard Wilmot—Physics	Tucson
Firth, Charles Abraham—Mathematics	Aravaipa
Felt, Lee Williamson—Latin	Emporium, Pa.
Glenn, John Brookes—Algebra	S. Boston, Va.
Irvine, Elroy S. J.—Chemistry, Trigonometry	Phoenix
Johnson, Erving A.—Mathematics	Morenci
La Tourrette, Lyman D—Chemistry, Trigonometry	Phoenix
McClure, John Clarendon—Chemistry	Tucson
McDole, Maynard Matthew—Chemistry	Tucson
Martin, Gladys Sarah—History	Tucson
McKay, Hazel—Stenography, Bookkeeping	Tucson
Murphey, Walter—Geometry	Tucson
Schiek, Albert G.—Chemistry, Trigonometry	Los Angeles, Cal.
Wetenkamp, Paul—Chemistry	Warren

SUMMARY.

Graduate Students	13	
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Unclassified, Preparatory	18	
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- The Annual Report of the President of the University to the Board of Regents.
- The Annual Register of the University.
- The Announcements of the School of Mines, the Geological Survey, and the Several Departments of Instruction and Research.